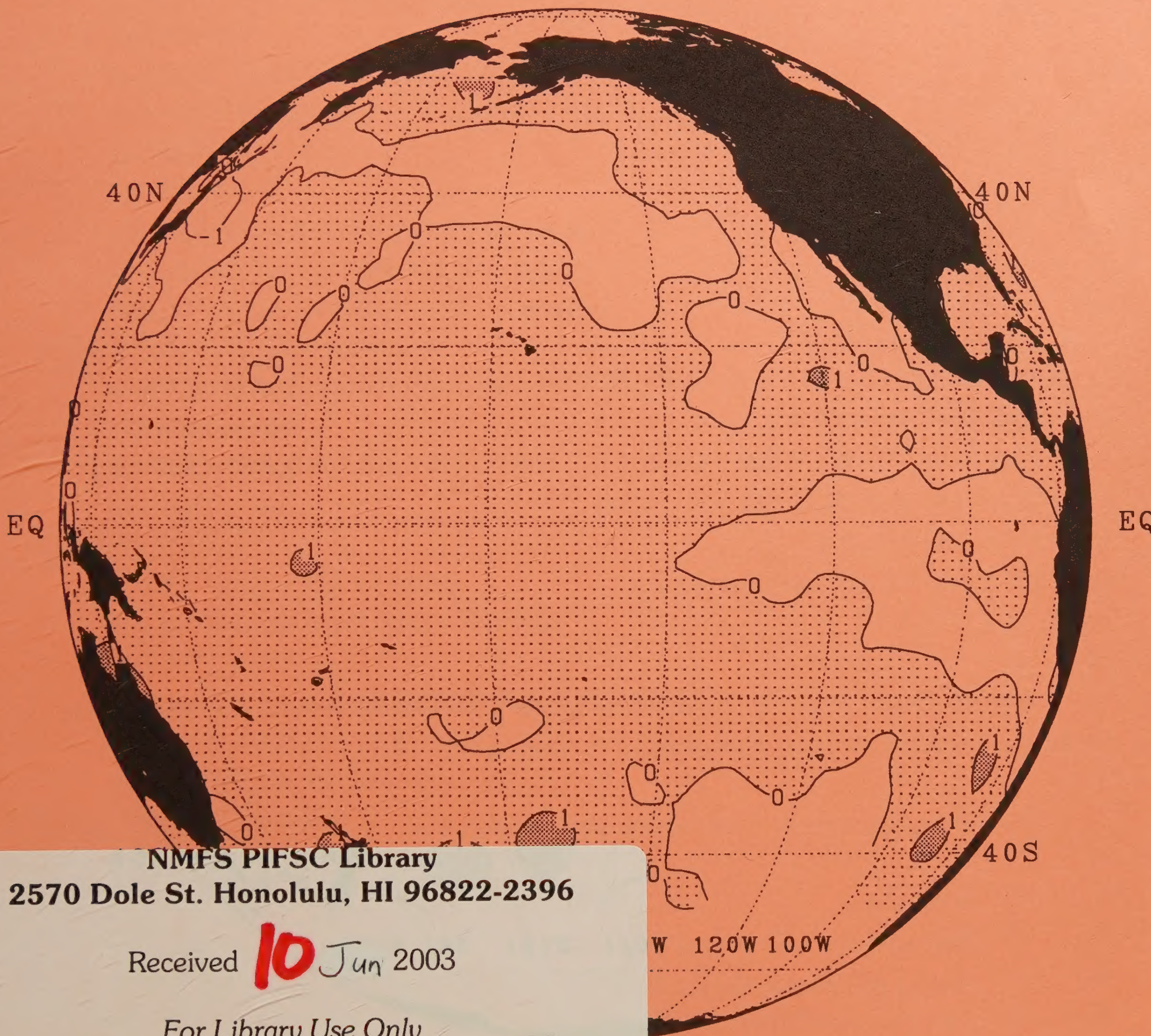
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Monthly Ocean Report
April 2003 (No. 124)



Climate and Marine Department
Japan Meteorological Agency

気象庁 気候・海洋気象部

平成15年4月

気象庁海洋月報は、気象庁 気候・海洋気象部 海洋気象情報室で作成しています。
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Monthly Ocean Report is prepared by the Office of Marine Prediction, Climate and Marine Department, Japan Meteorological Agency.

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表紙は、2003 年 4 月の太平洋の月平均海面水温偏差図です。
陰影部は、平年より高温の海域を示しています。

The figure on the front cover shows the monthly mean SST anomalies for April 2003 in the Pacific Ocean.
Areas of positive anomalies are shaded.

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海況の特徴（２００３年４月）

日本近海の海況

海面水温は、千島列島周辺から三陸沖、および常磐沖にかけて平年より１℃以上低く、38°N、144°E付近の海域では-２℃を超える負偏差が見られた。27°N、136°E付近では平年より１℃以上高かった（図４）。

黒潮は、九州の東で離岸し、上・中旬は紀伊半島に接岸、下旬は紀伊半島の南で小さく蛇行していた。東海沖を東進した後、上旬は三宅島付近を通過し、33.5°N付近まで南下した後、141°Eに沿って北上し、房総半島沖を北北東に流れていた。中旬は、八丈島の北で北北東に向きを変え、下旬は34°N、141°E付近で北北東に向きを変えて、房総半島沖を流れていた（図９）。

太平洋の海況

太平洋赤道域の海面水温は、135°E から170°Wにかけて平年より0.5℃以上高かった。一方、120°W付近と100°Wから85°Wにかけては平年より0.5℃以上低かった。

北太平洋の海面水温は、アラスカ湾からベーリング海にかけてと、35°N、175°E付近、15°N、120°W付近、および15°N、165°W付近で平年より0.5℃以上高かった（図１７）。

Highlights April 2003

Seas adjacent to Japan

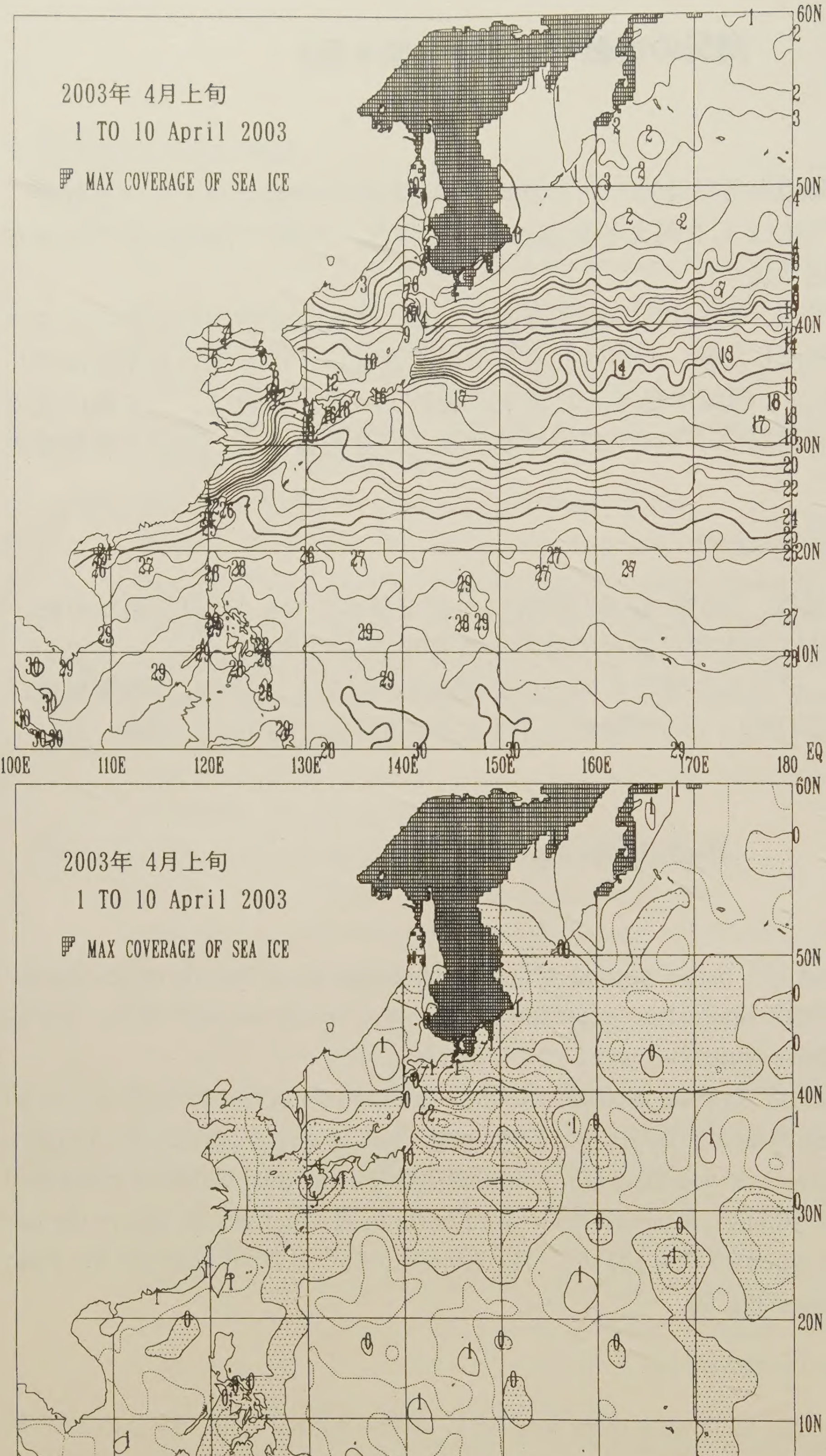
SSTs were more than 1℃ below normal in the seas from the Kuril Islands to off Sanriku and off Joban. Negative SST anomalies exceeding -2℃ were found around 38°N, 144°E. SSTs were more than 1℃ above normal around 27°N, 136°E (Fig. 4).

The Kuroshio flowed off Kyushu, then close to the Kii Peninsula in the first and second 10 days, and then it slightly meandered off the Kii Peninsula in the last 10 days. In the first 10 days, it passed near Miyake Island and flowed SE-ward to around 33.5°N, and then it flowed northward along 141°E. In the second 10 days, it turned NNE-ward north of Hachijo Island, and in the last 10 days it turned NNE-ward around 34°N, 141°E. The Kuroshio flowed NNE-ward off the Boso Peninsula throughout the month (Fig. 9).

Pacific Ocean

In the equatorial Pacific, SSTs were more than 0.5℃ above normal from 135°E to 170°W. Negative SST anomalies exceeding -0.5℃ were found around 120°W and from 100°W to 85°W.

In the North Pacific, SSTs were more than 0.5℃ above normal in the seas from the Gulf of Alaska to the Bering Sea, around 35°N, 175°E, around 15°N, 120°W and around 15°N, 165°W (Fig. 17).



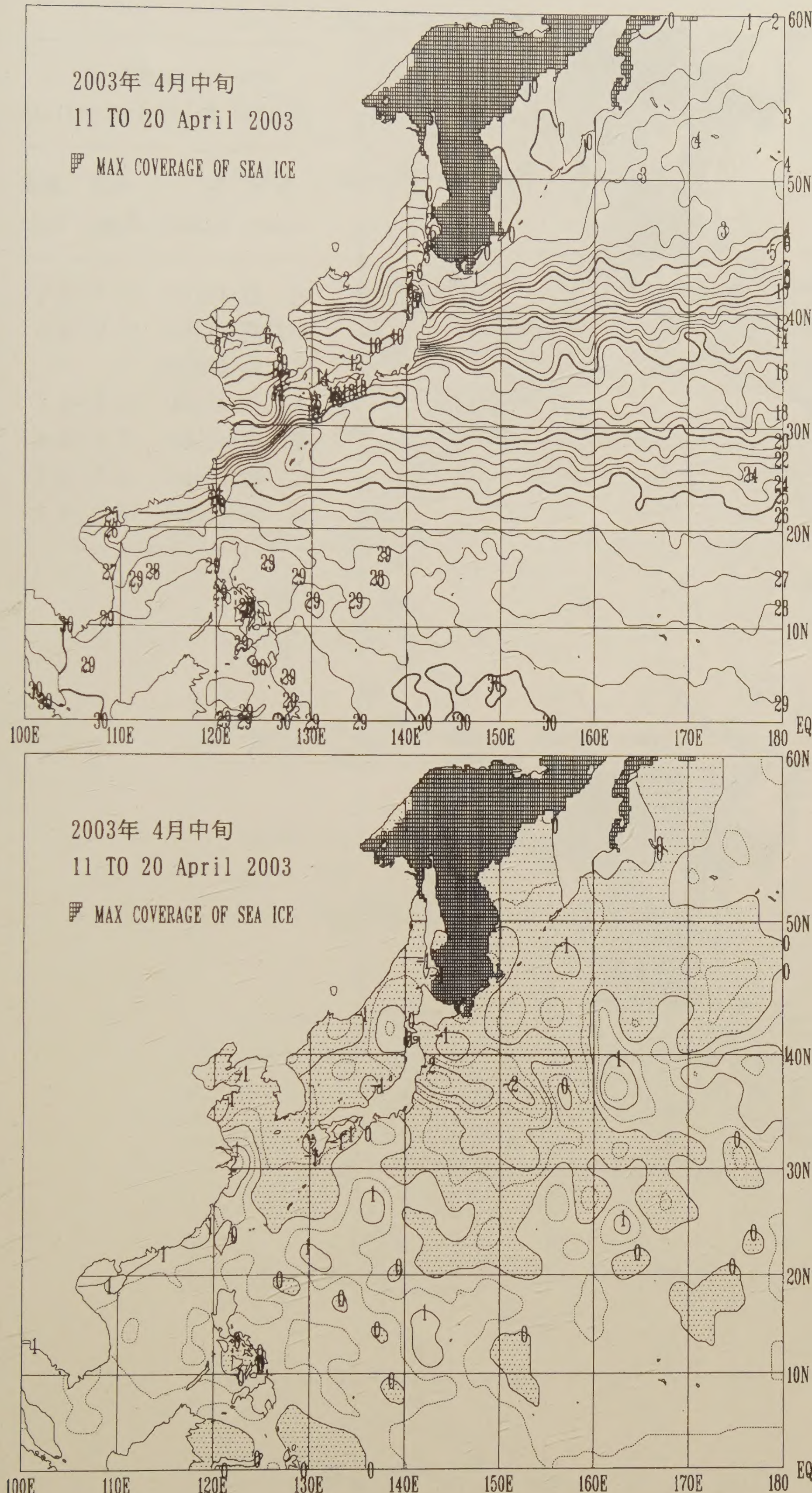
旬平均沿岸水温(℃)
Coastal Water Temperature

地点名 (Index Number)	水温 Temp.	偏差 Anom.
石　垣(47918)	23.4	0.1
御前崎(47655)	14.2	-0.1
八丈島(47678)	-	-
小名浜(47598)	8.6	-1.1
宮　古(47585)	6.3	-0.3
江　差(47428)	8.6	1.1
浜　田(47755)	13.6	0.0

第1図 北西太平洋旬平均海面水温図(上)及び偏差図(下) (2003年 4月上旬)

Fig.1 Ten-day mean SST (top) and anomalies (bottom) in the western North Pacific for the 1st ten-day period in April 2003. Anomalies are computed from the JMA climatology (1971-2000). Contour interval is 1°C and additional anomaly contours of 0.5°C are shown by broken lines. Negative anomalies are spotted.

Ten-day mean SST & Anomalies



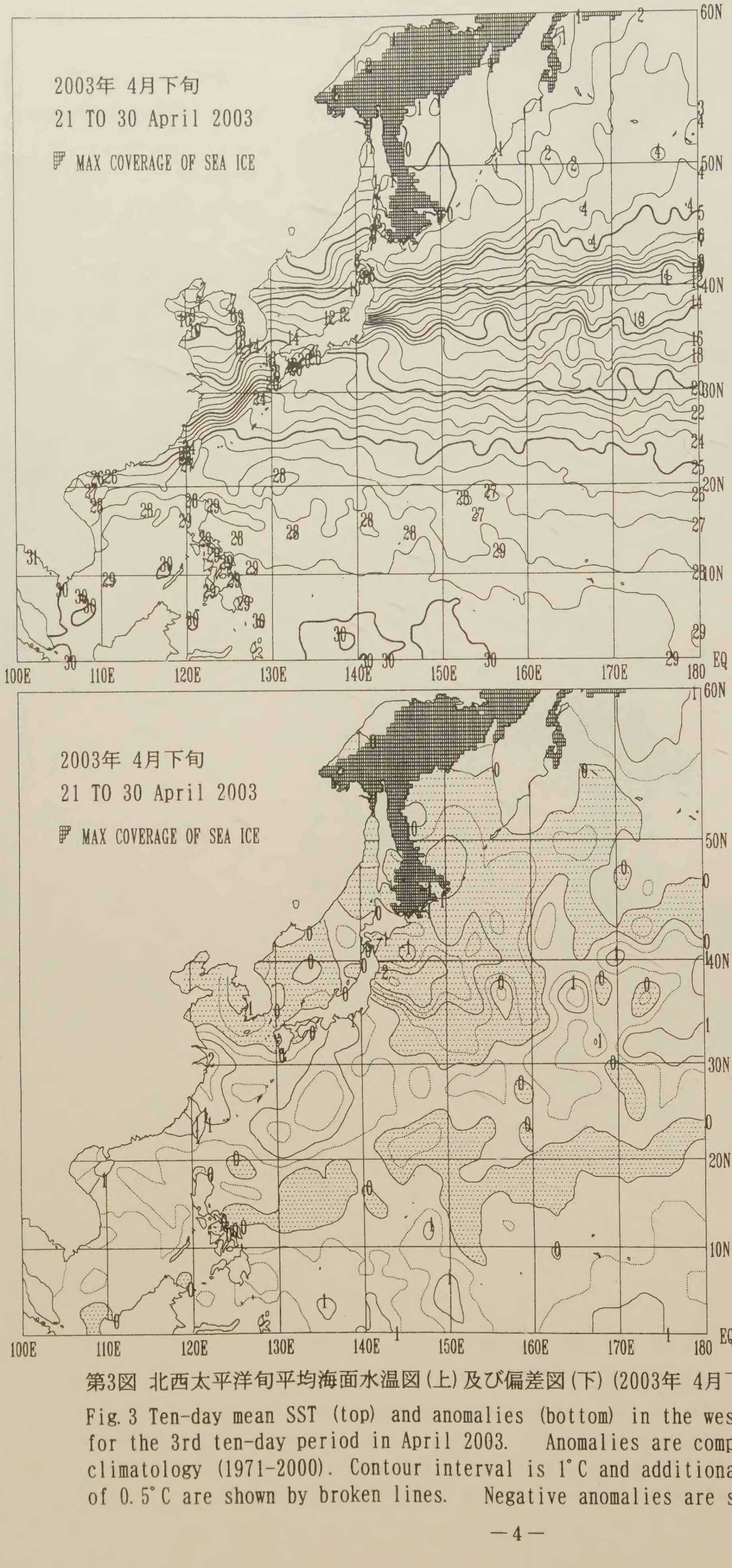
旬平均沿岸水温(℃)
Coastal Water Temperature

地点名 (Index Number)	水温 Temp.	偏差 Anom.
石　垣(47918)	24.4	0.3
御前崎(47655)	16.3	0.8
八丈島(47678)	-	-
小名浜(47598)	10.1	-0.7
宮　古(47585)	6.0	-1.1
江　差(47428)	8.7	0.4
浜　田(47755)	14.7	0.4

第2図 北西太平洋旬平均海面水温図(上)及び偏差図(下)(2003年 4月中旬)

Fig. 2 Ten-day mean SST (top) and anomalies (bottom) in the western North Pacific for the 2nd ten-day period in April 2003. Anomalies are computed from the JMA climatology (1971-2000). Contour interval is 1°C and additional anomaly contours of 0.5°C are shown by broken lines. Negative anomalies are spotted.

Ten-day mean SST & Anomalies



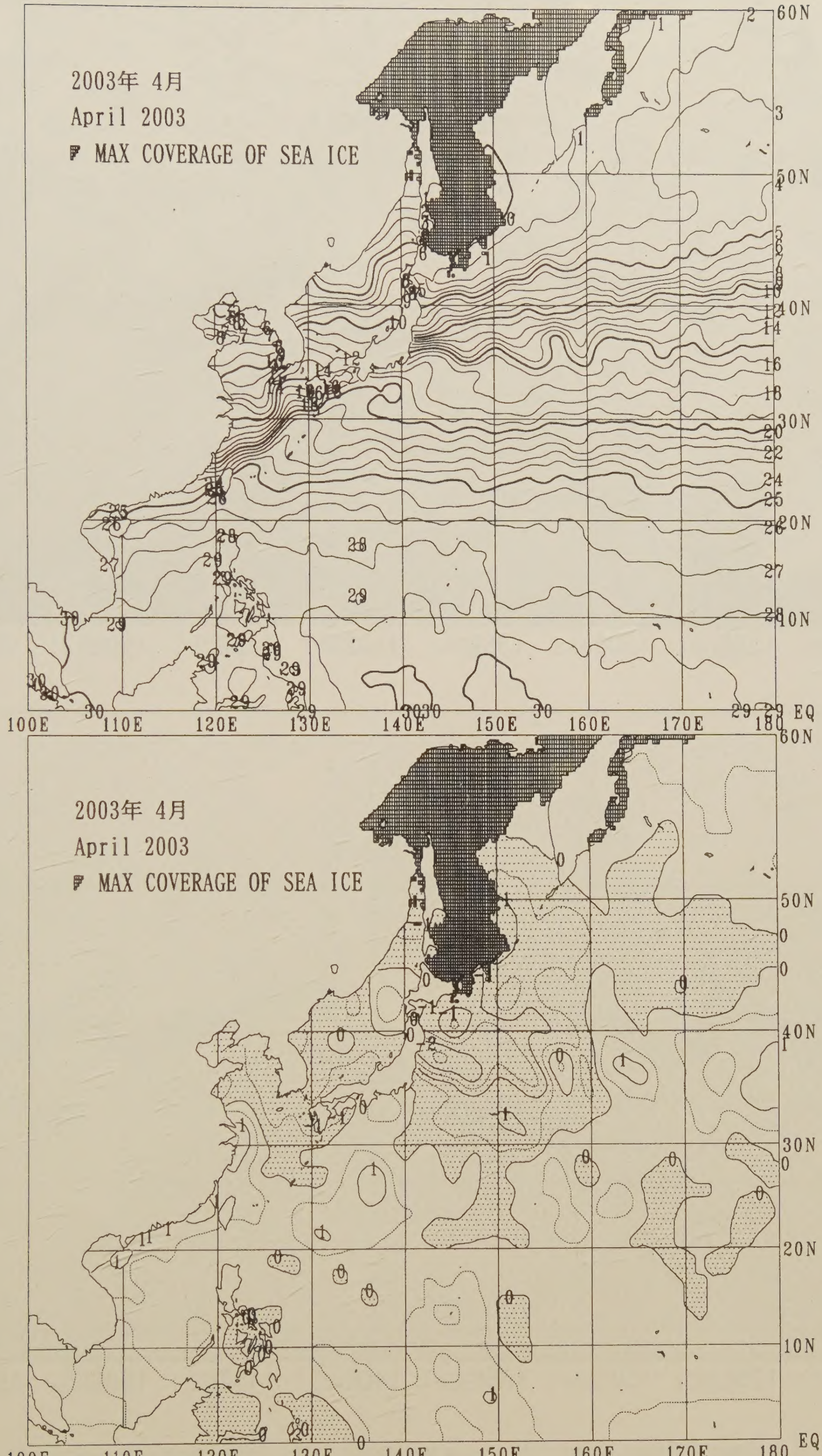
旬平均沿岸水温(℃)
Coastal Water Temperature

地点名 (Index Number)	水温 Temp.	偏差 Anom.
石　垣(47918)	25.4	0.5
御前崎(47655)	17.0	0.6
八丈島(47678)	-	-
小名浜(47598)	10.9	-0.7
宮　古(47585)	7.5	-0.2
江　差(47428)	9.7	0.4
浜　田(47755)	15.7	0.2

第3図 北西太平洋旬平均海面水温図(上)及び偏差図(下)(2003年 4月下旬)

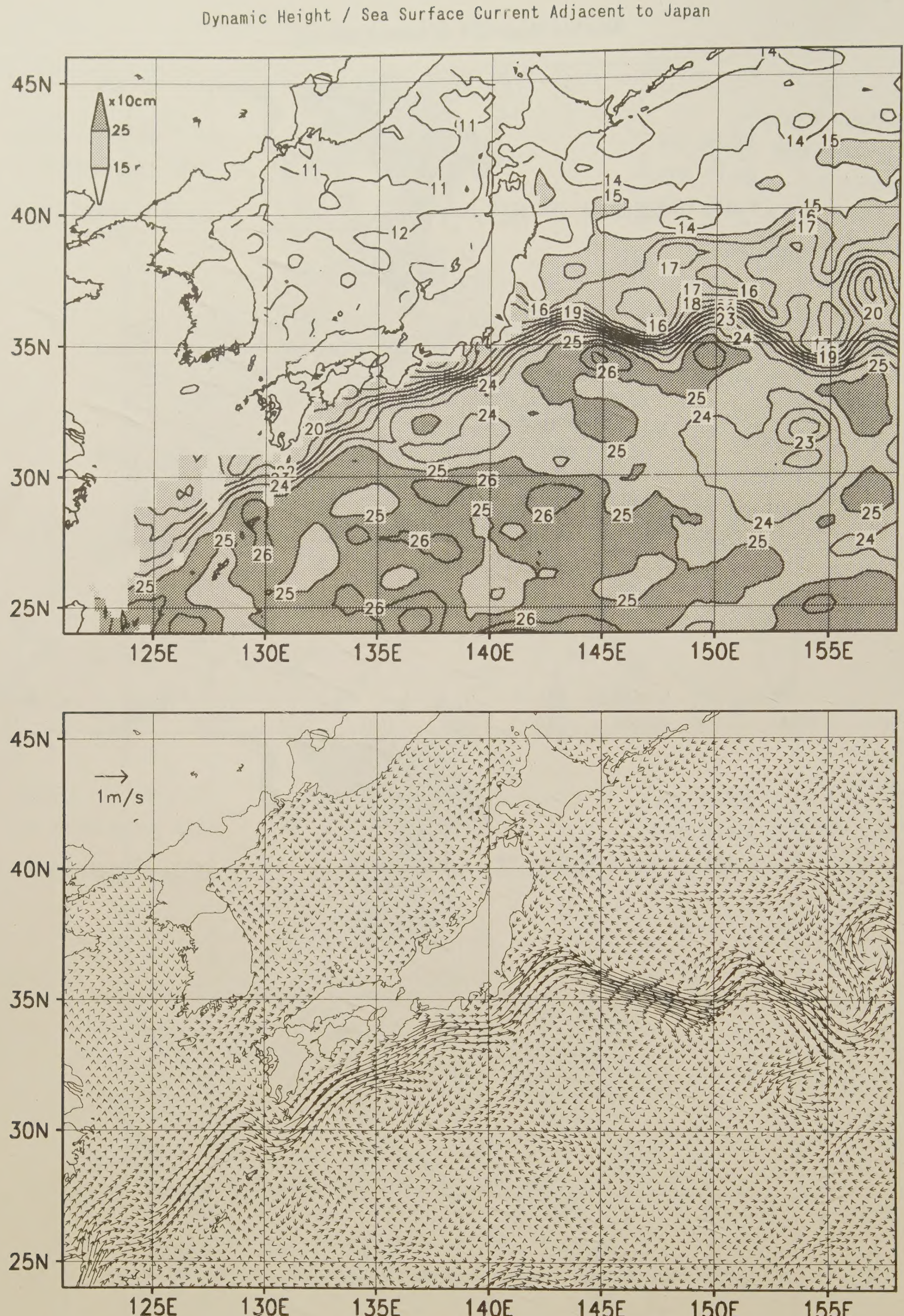
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Monthly Mean SST & Anomalies



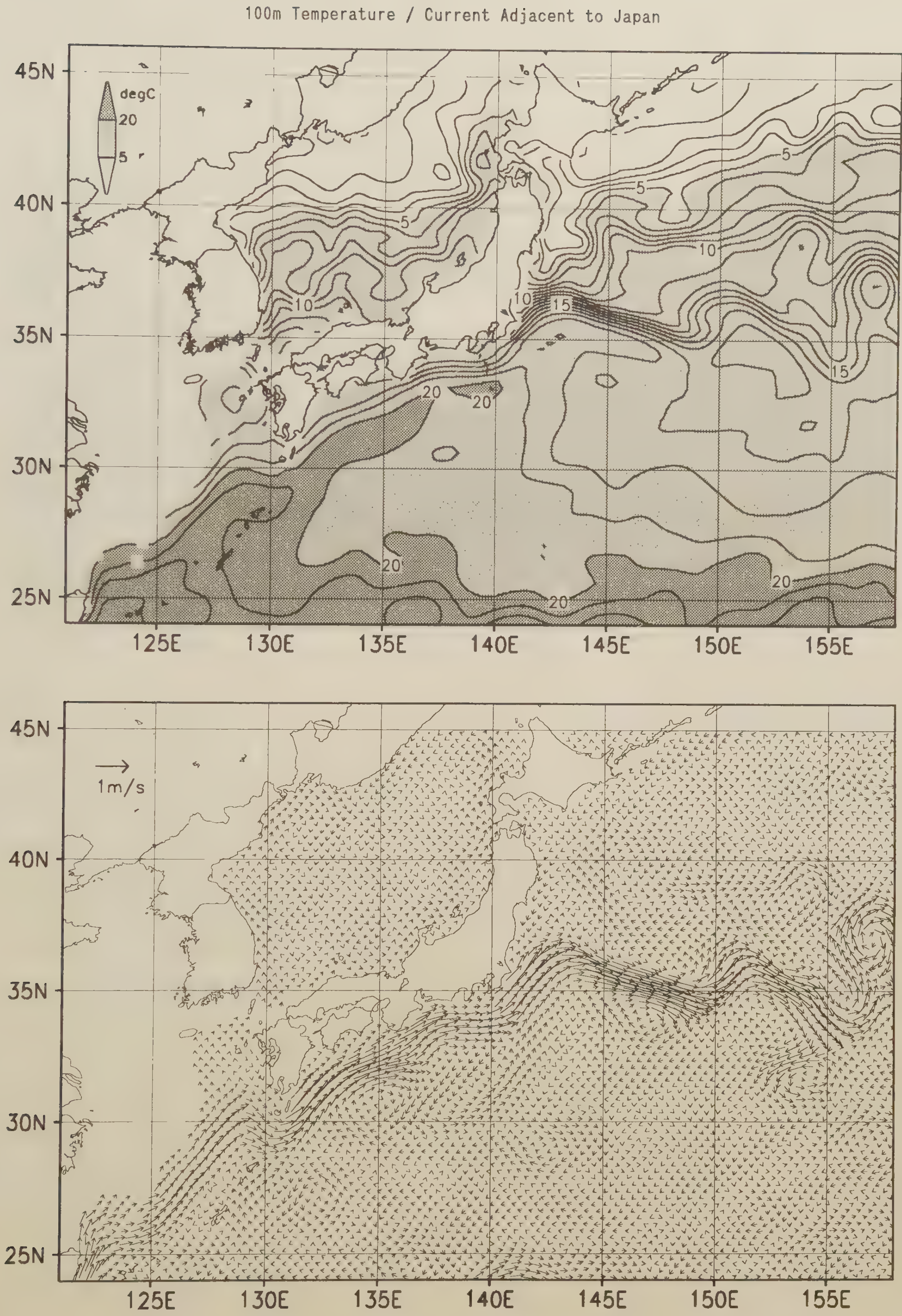
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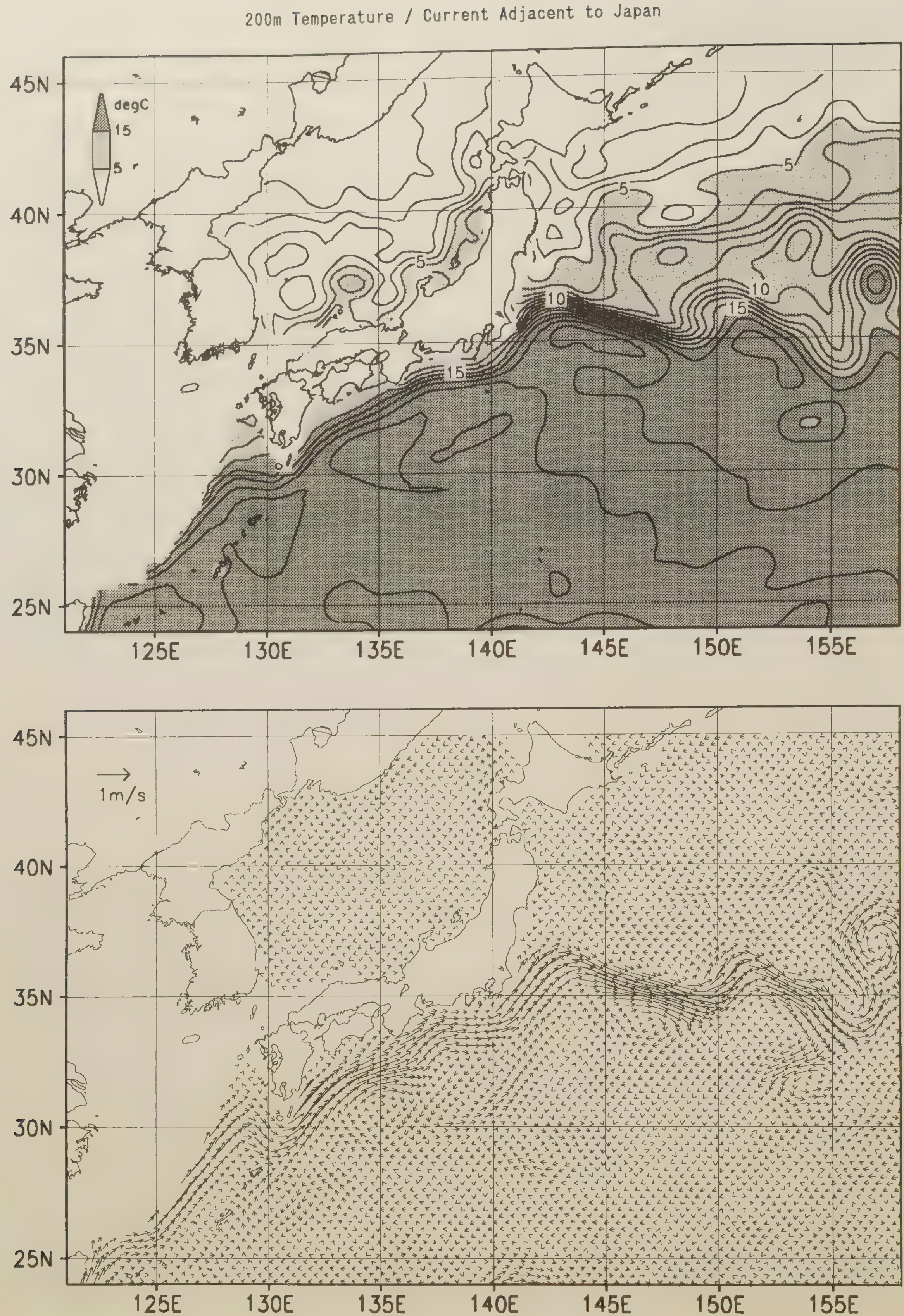
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第 6 図　日本近海月平均表層水温図（上）と表層海流図（下）（深さ 100 m）（2003 年 4 月）（海洋総合解析システムによる）

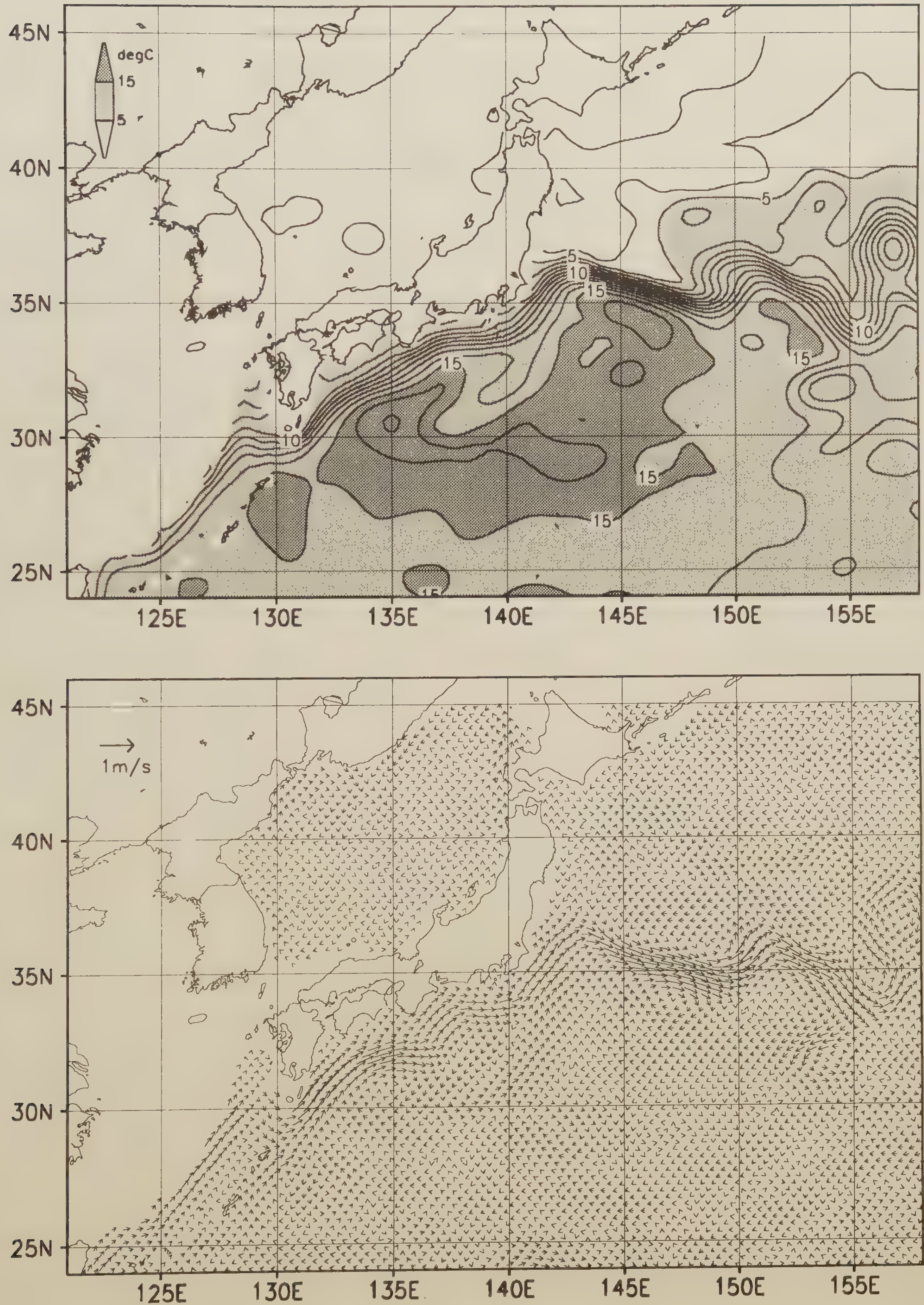
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（海洋総合解析システムによる）

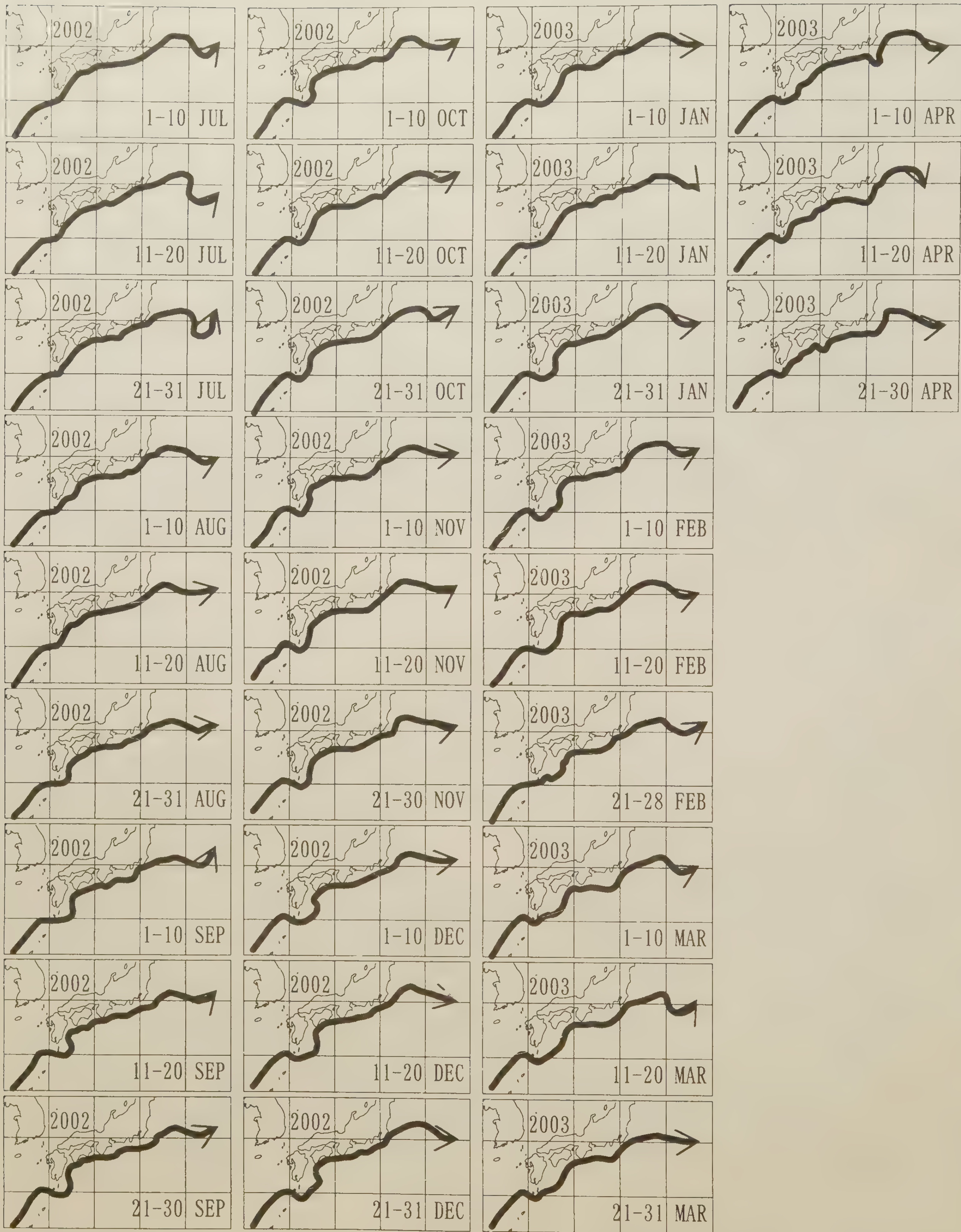
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400m Temperature / Current Adjacent to Japan



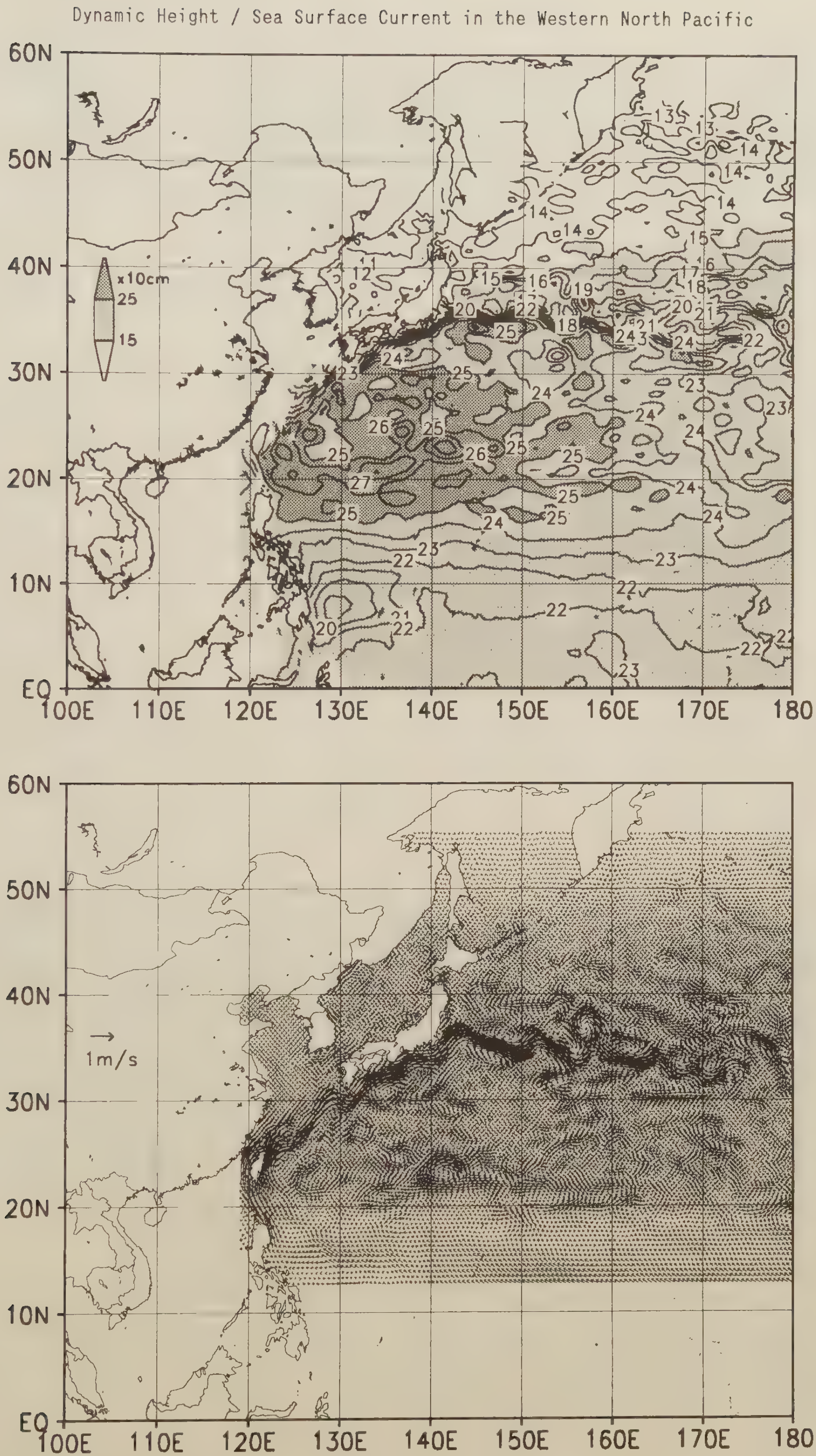
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（海洋総合解析システムによる）

Fig. 8　Monthly mean subsurface (400 m) temperature (top) and current (bottom) in seas adjacent to Japan for April 2003. Contour interval is 1 ℃ (top). (calculated by the Ocean Comprehensive Analysis System)



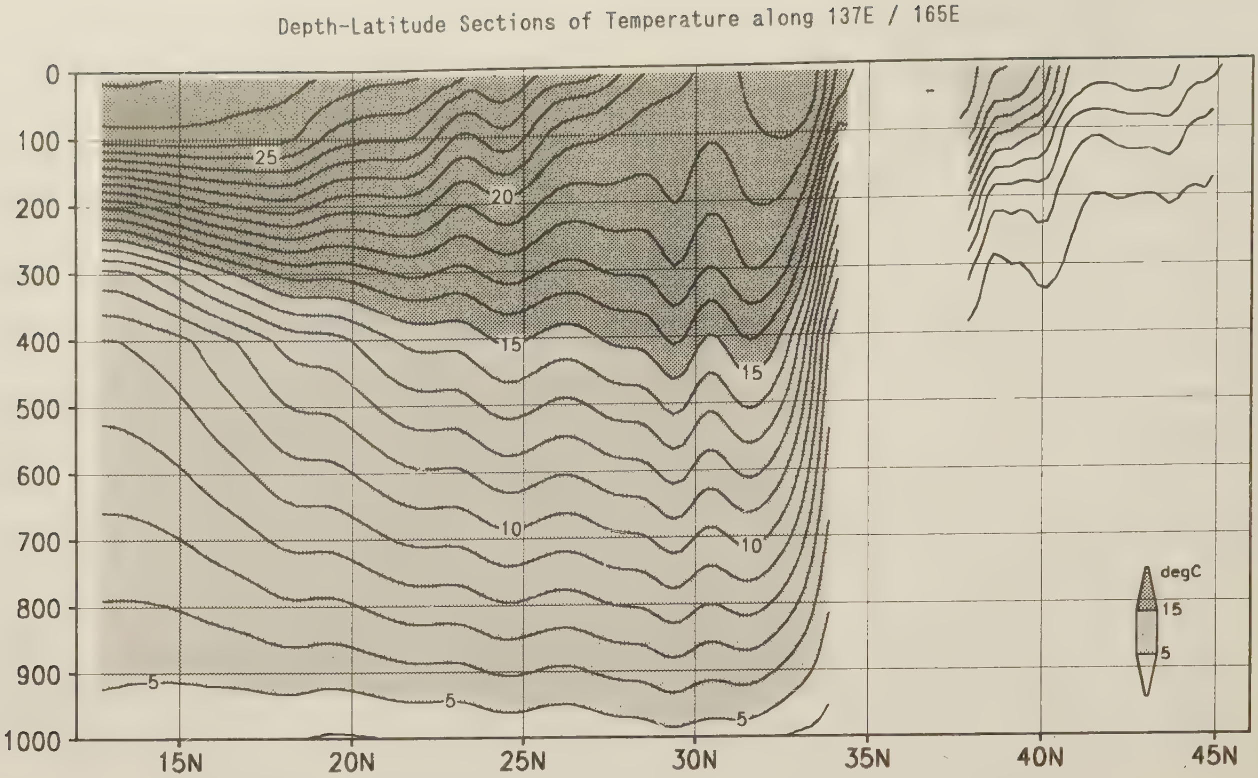
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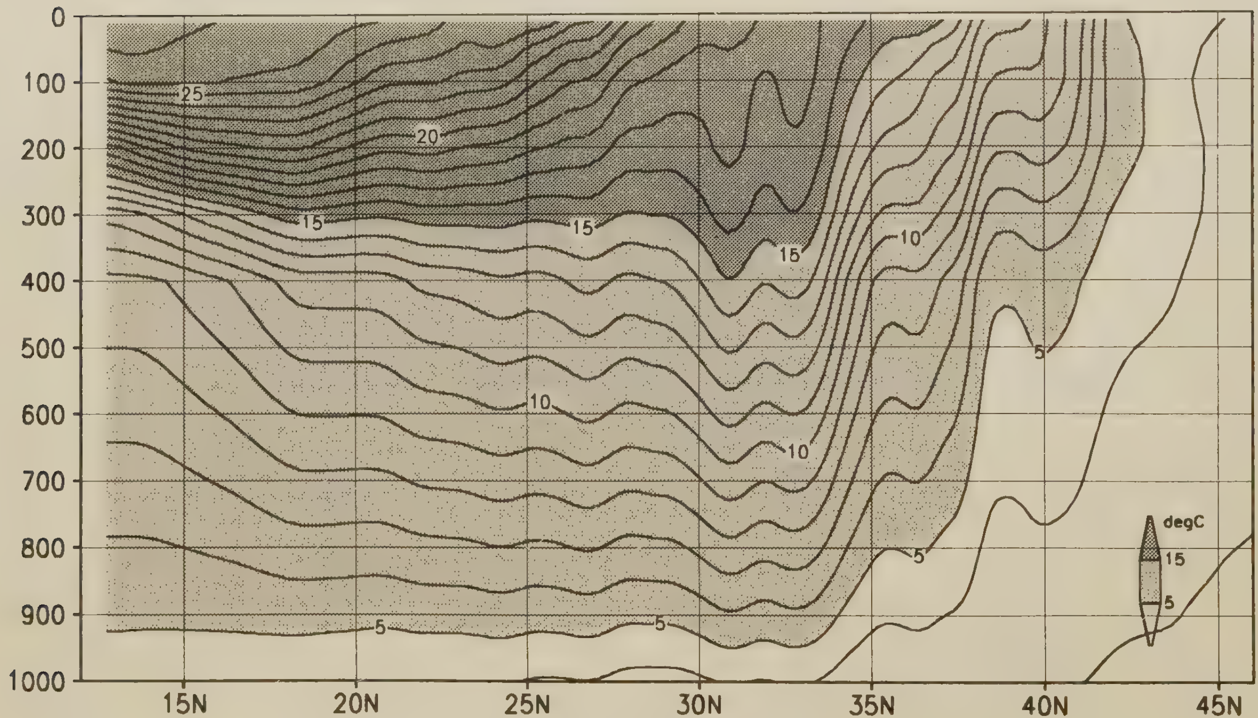
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Fig. 10　Monthly mean sea surface height (top) and current (bottom) in the western North Pacific for April 2003. Contour interval is 10cm (top). (calculated by the Ocean Comprehensive Analysis System)



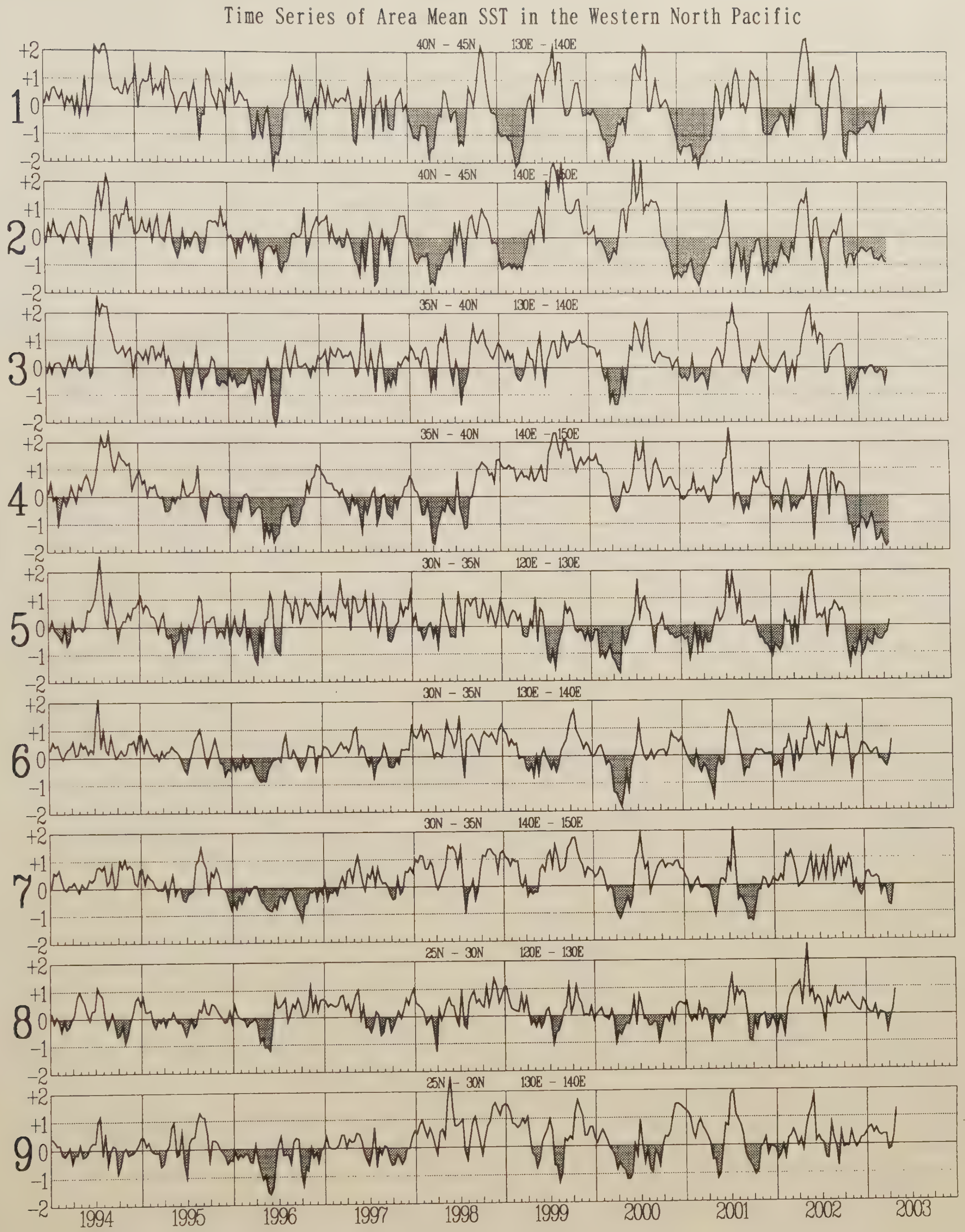
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（海洋総合解析システムによる）

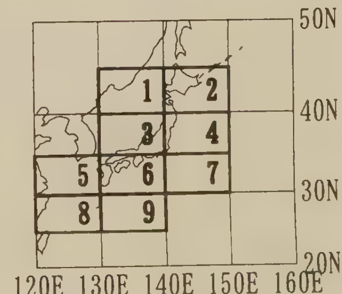
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（海洋総合解析システムによる）

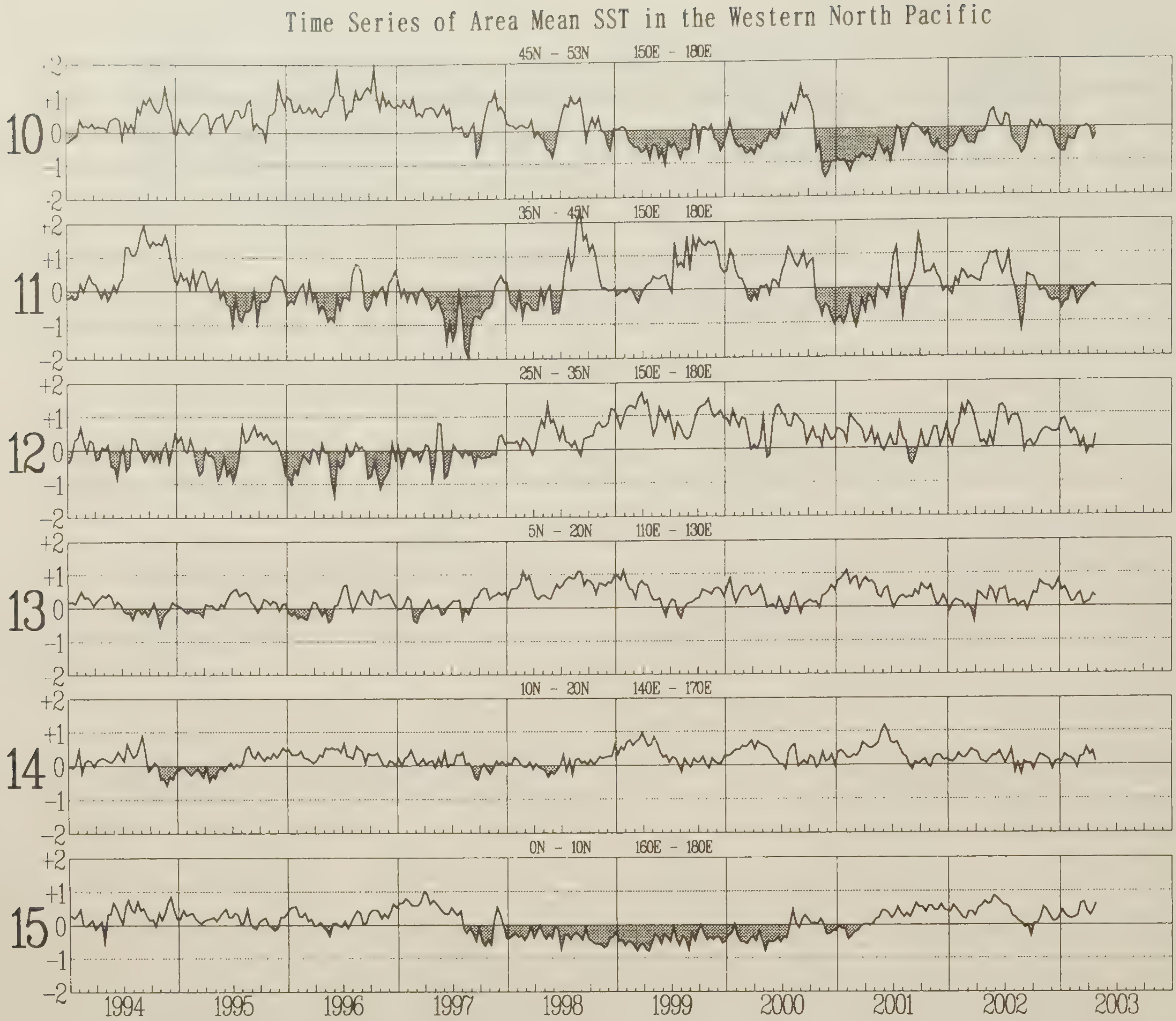
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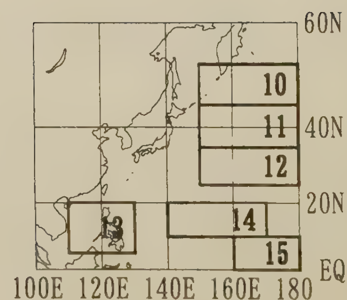
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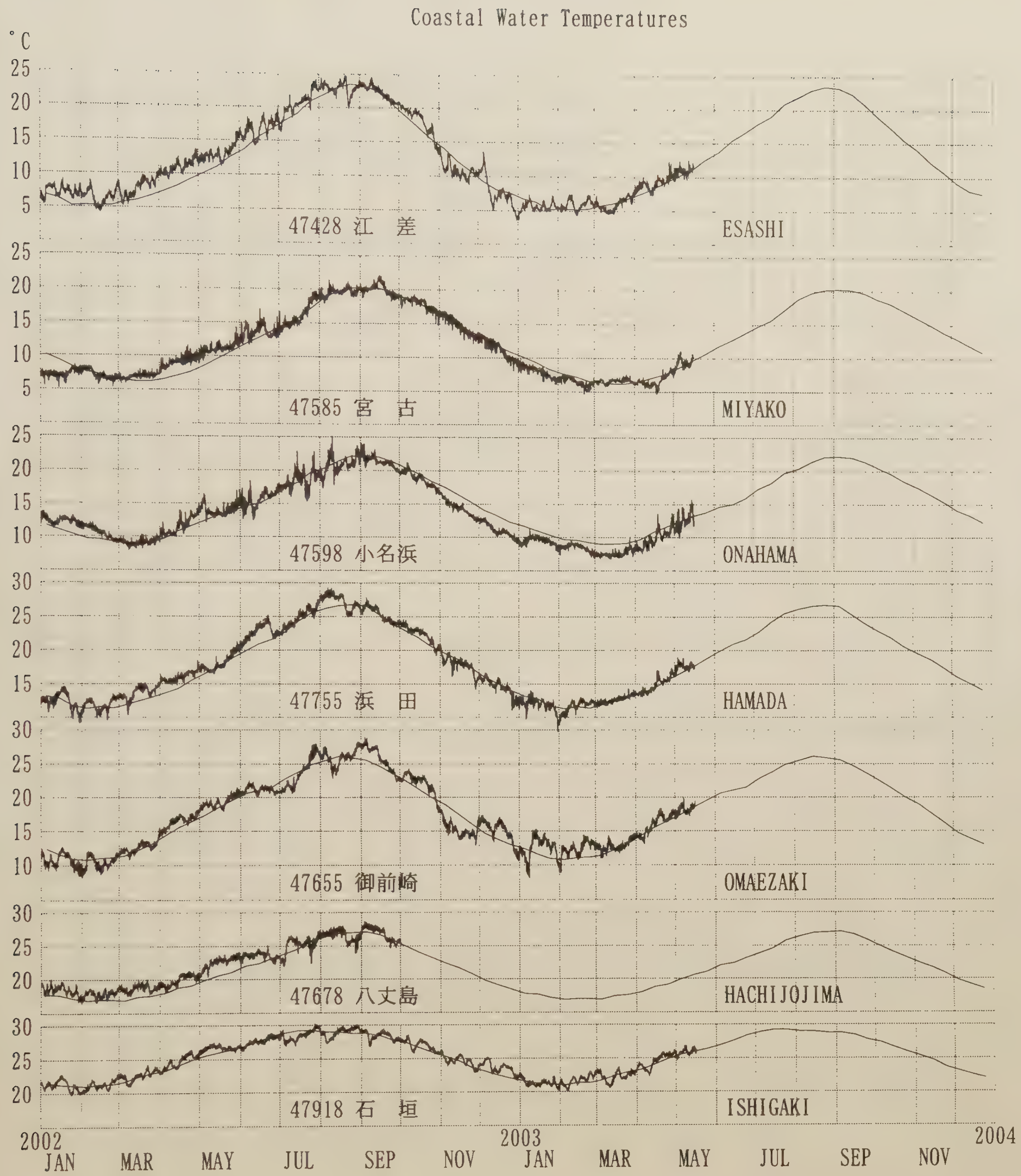
Fig. 13 Time series of the ten-day mean SST anomalies (°C) in the western North Pacific for the areas shown in the right panel. Negative anomalies are shaded. Anomalies are computed from the JMA climatology (1971-2000).



第13図　海域別旬平均海面水温平年偏差時系列図（つづき）

Fig. 13 (continue) Time series of the ten-day mean SST anomalies (°C) in the western North Pacific for the areas shown in the right panel. Negative anomalies are shaded. Anomalies are computed from the JMA climatology (1971-2000).

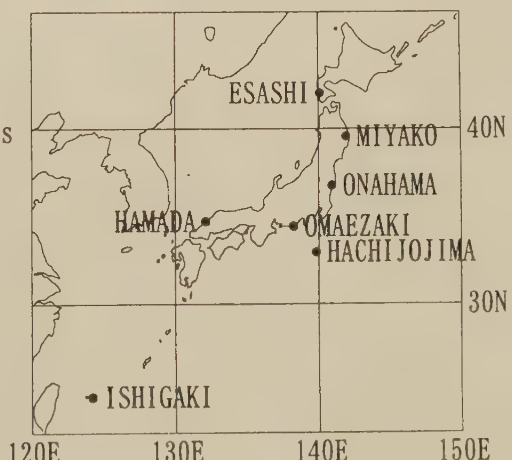


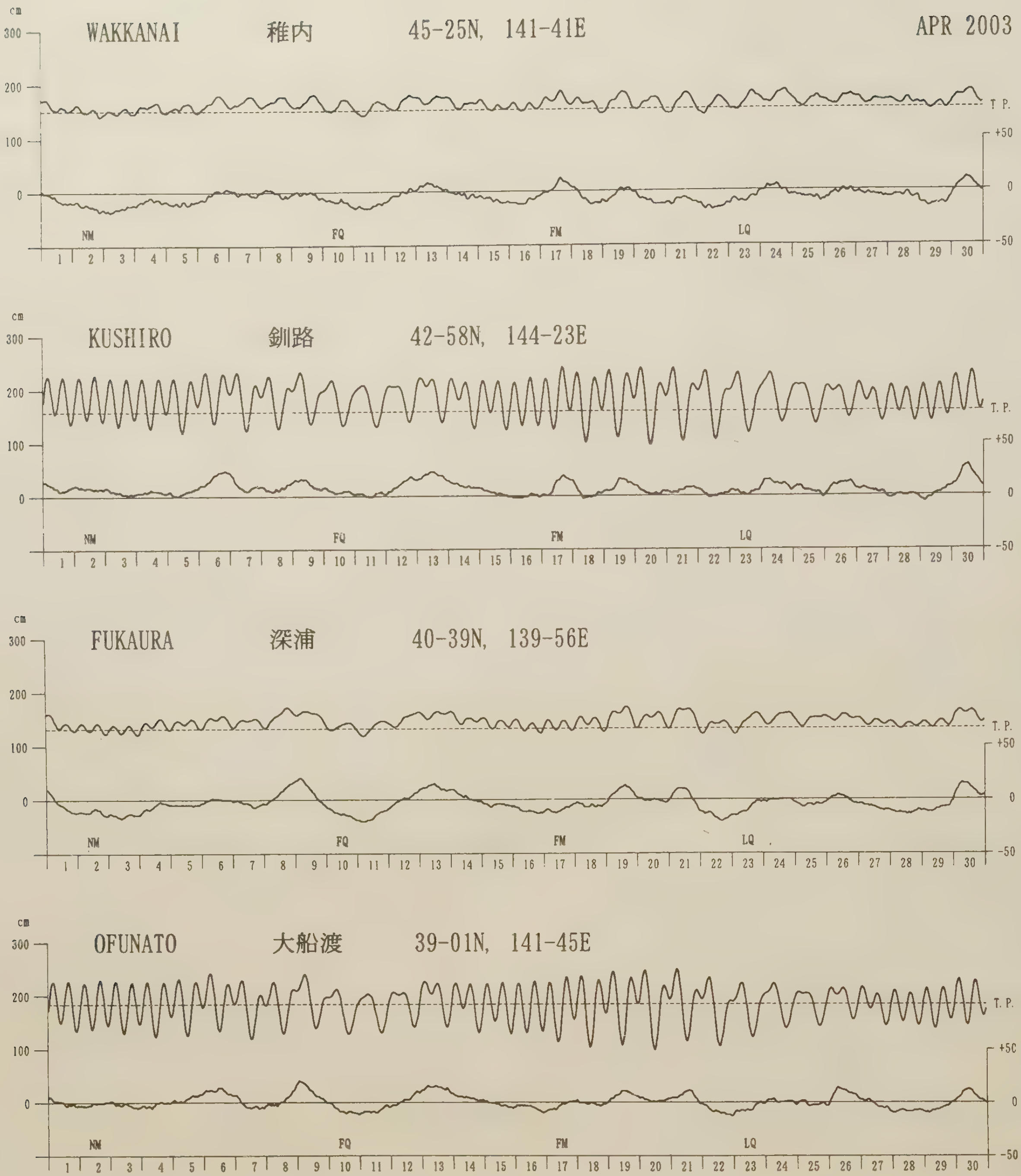


第14図 沿岸水温時系列図

Fig. 14 Time series of hourly coastal water temperatures (°C) measured at 7 coastal stations of the JMA shown in the right panel.

Thin lines show ten-day mean climatology.

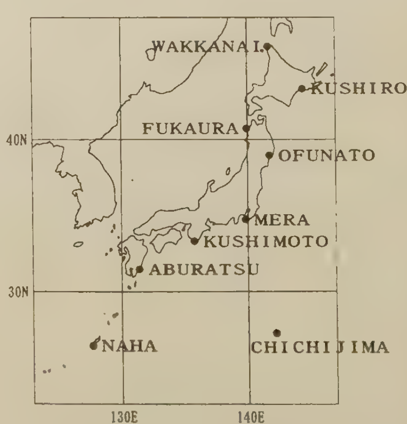


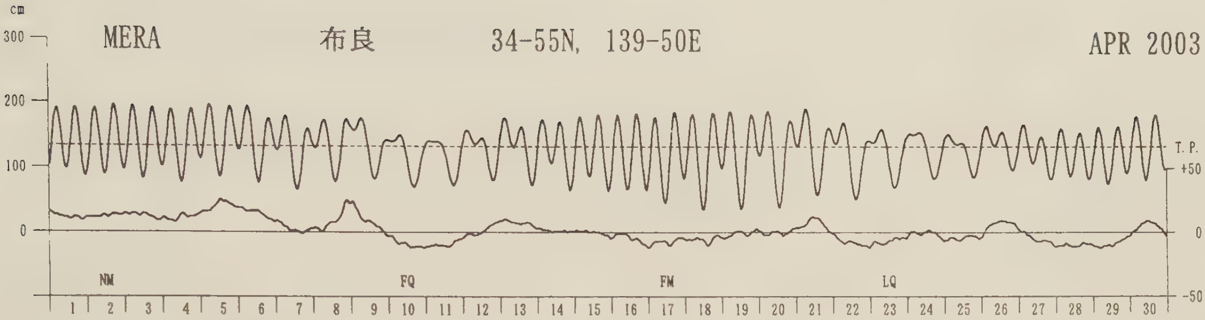


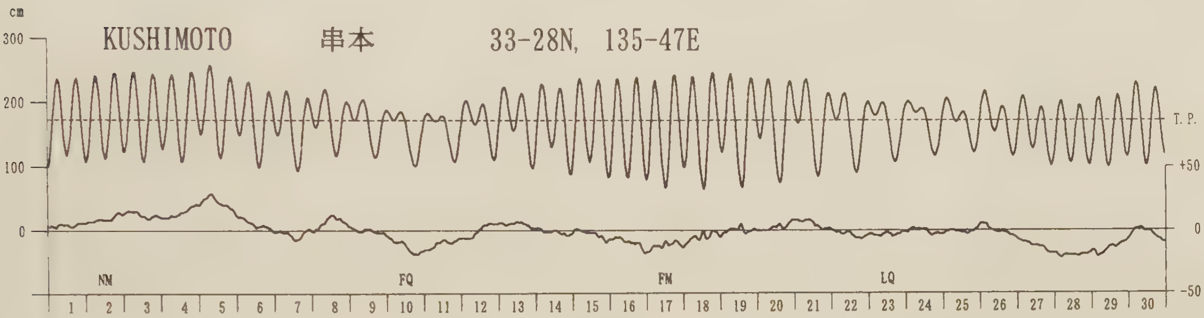
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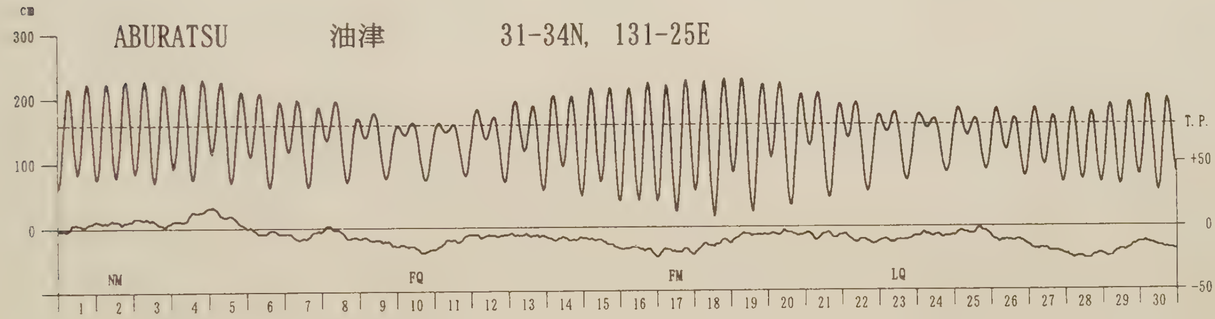
Fig. 15 Time series of hourly sea level observation (upper line) and its anomalies (lower line) at 9 stations of the JMA in the right panel.
Short term variations are removed from raw data.

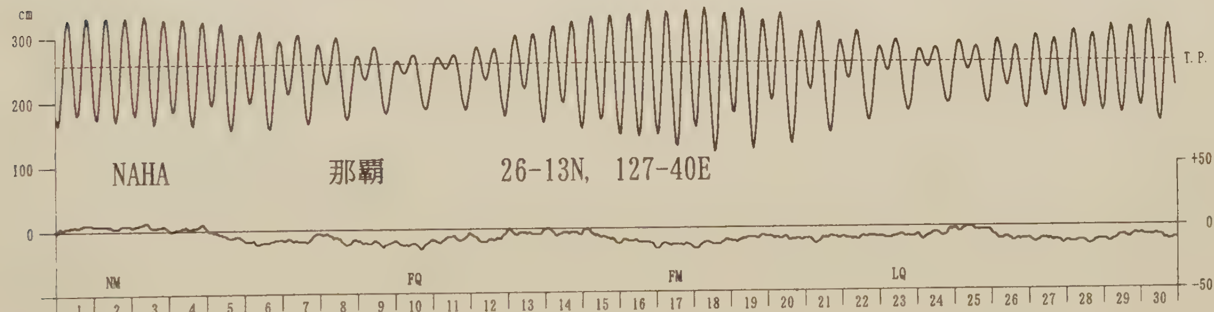
NM: new moon, FQ: first quarter
FM: full moon, LQ: last quarter
T. P. : Mean sea level of Tokyo Bay (Tokyo Peil)

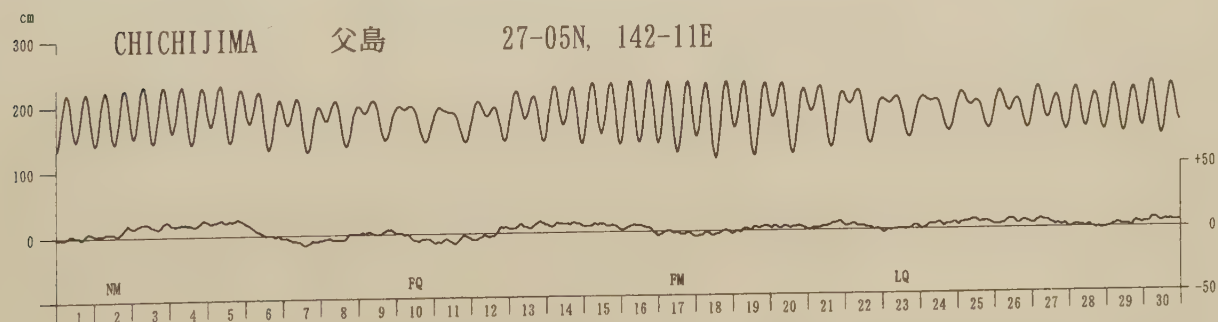






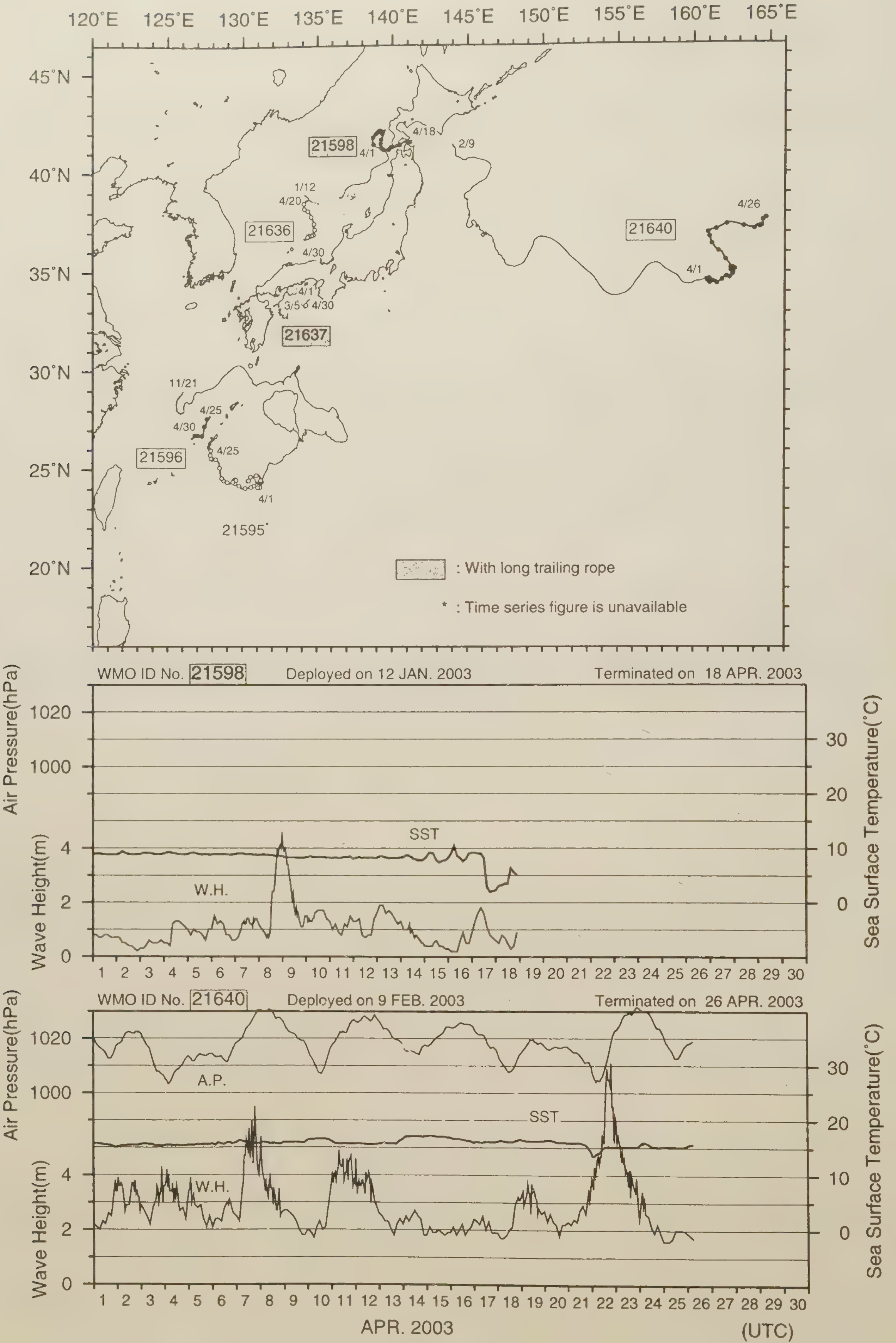




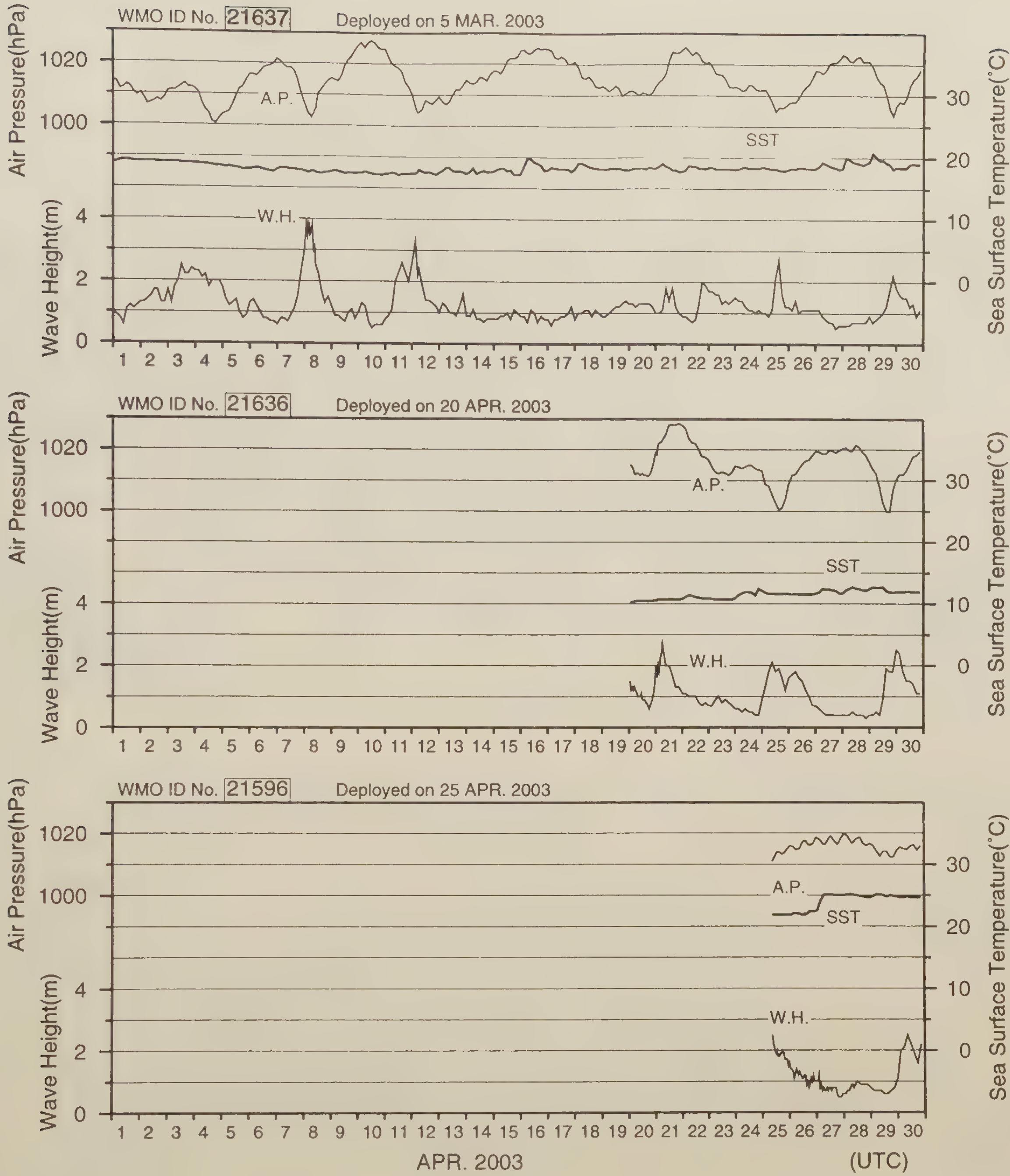


第15図 つづき

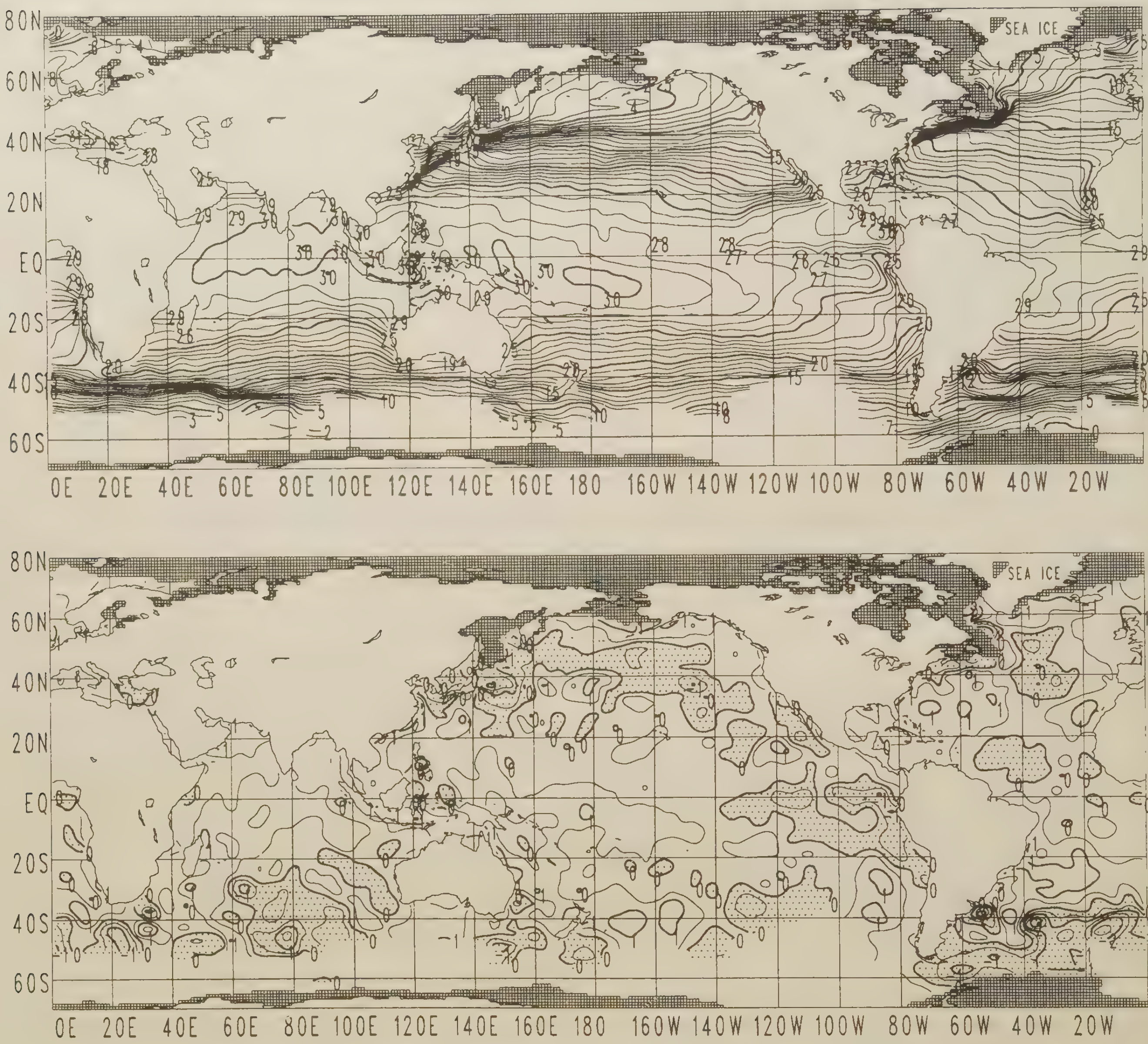
Fig. 15 continue



第16図　漂流型海洋気象ブイロボットの軌跡と観測要素の時系列図
Fig.16　Time series of JMA drifting buoy observation.
The upper panel shows paths of the buoys. Circles denote the position at 00h UTC everyday.
The lower panel shows time series of observation data.

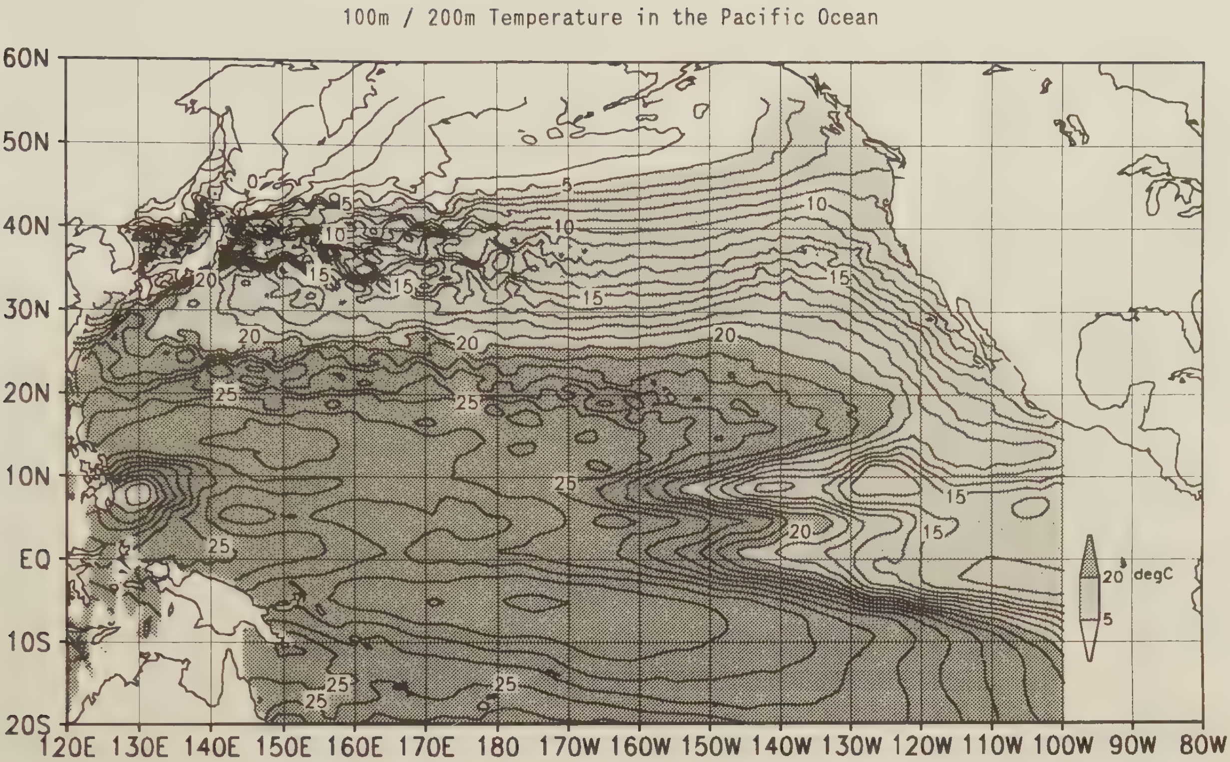


第16図 つづき
Fig.16　continue



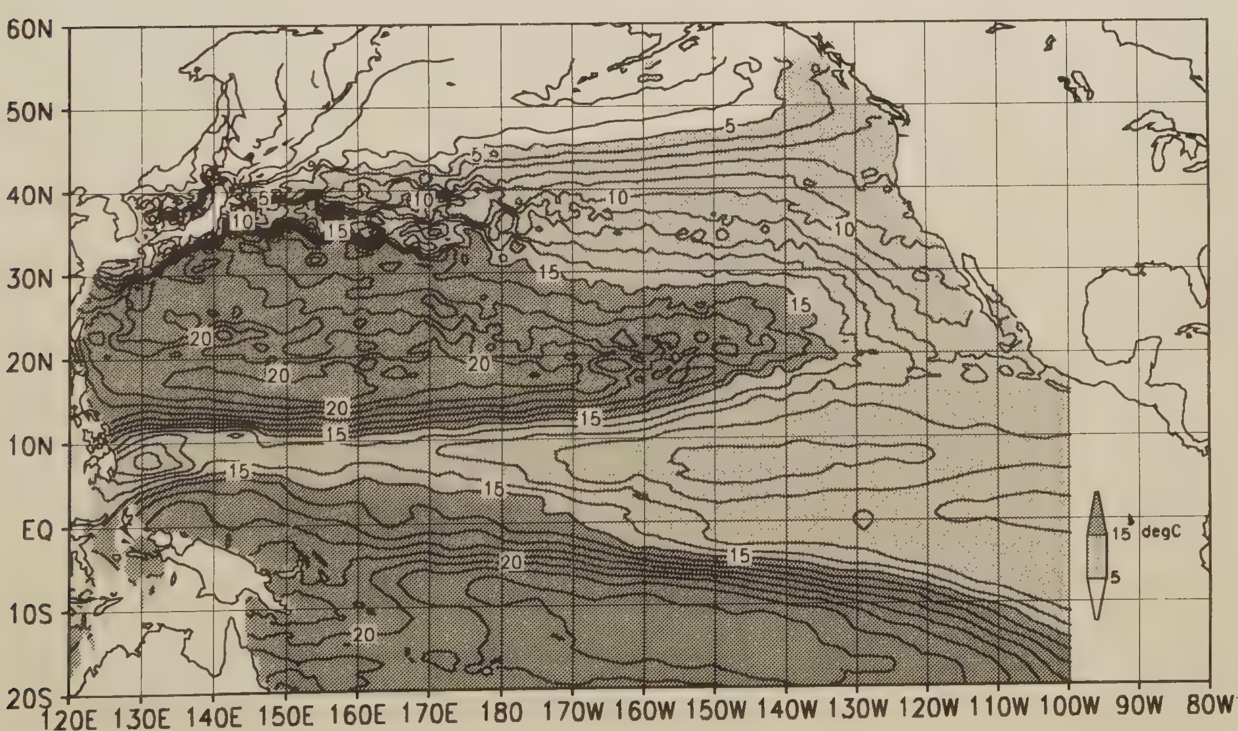
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Fig. 17 Monthly mean SST over the global ocean (top) and anomalies (bottom) for April 2003. Anomalies are computed from the JMA climatology (1971-2000). Contour interval is 1°C (top) and additional anomaly contours of ±0.5°C are shown by thin lines. Negative anomalies are spotted. Maximum coverage of sea ice is shaded. Data sources for sea ice are U.S. National Ice Center (polar regions) and JMA (the Sea of Okhotsk).



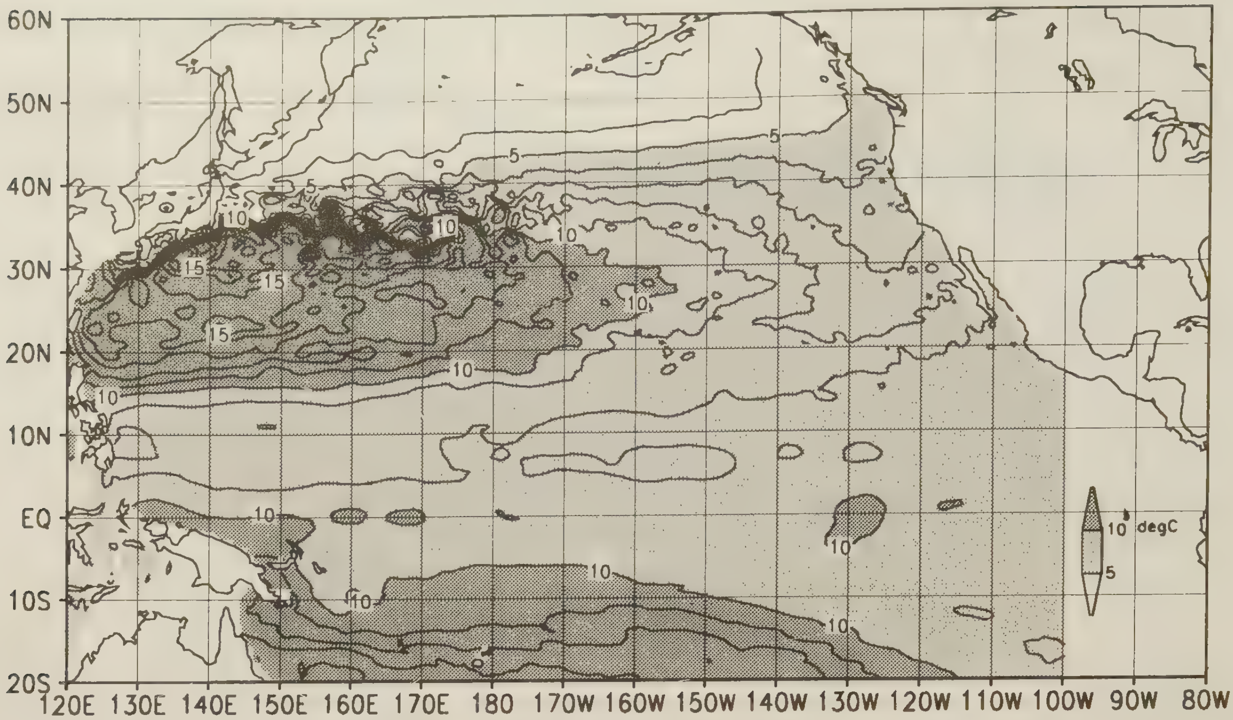
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（海洋総合解析システムによる）

Fig. 18　Monthly mean subsurface (100 m) temperature in the Pacific Ocean for April 2003. Contour interval is 1 ˚C. (calculated by the Ocean Comprehensive Analysis System)



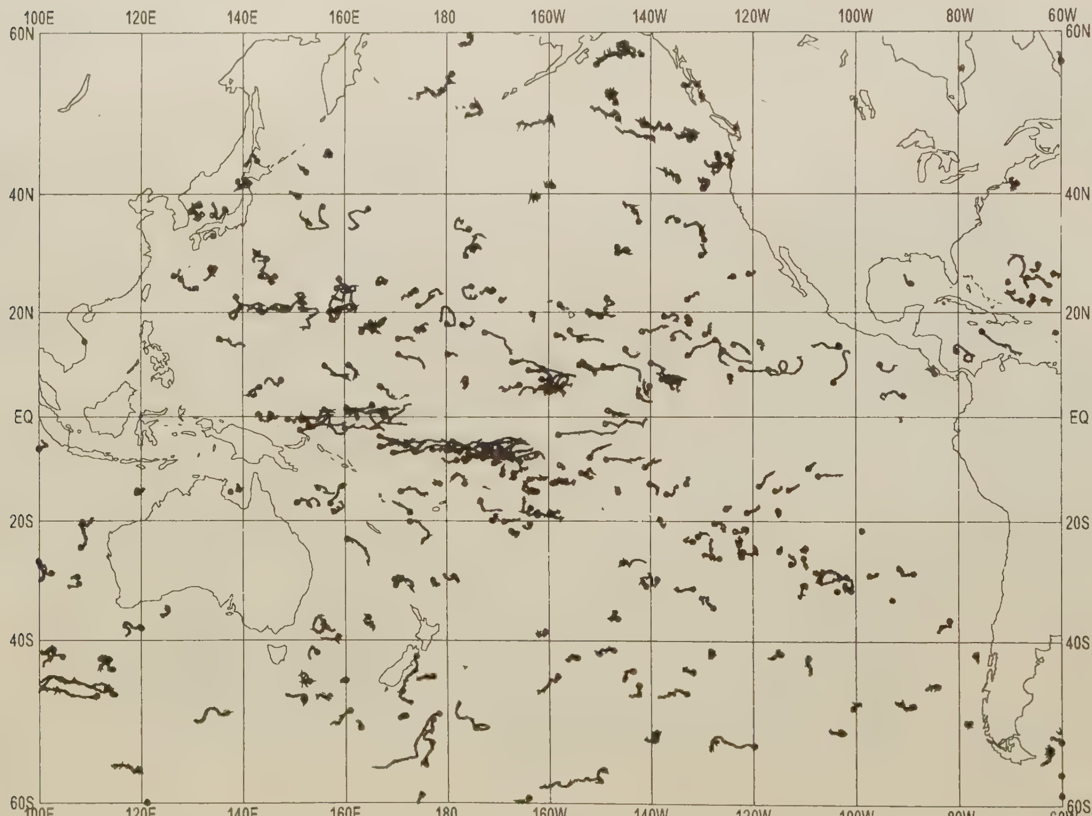
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（海洋総合解析システムによる）

Fig. 19　Monthly mean subsurface (200 m) temperature in the Pacific Ocean for April 2003. Contour interval is 1 ˚C. (calculated by the Ocean Comprehensive Analysis System)



第 20 図　太平洋月平均表層水温図（深さ 400 m）　(2003 年 4 月)
（海洋総合解析システムによる）

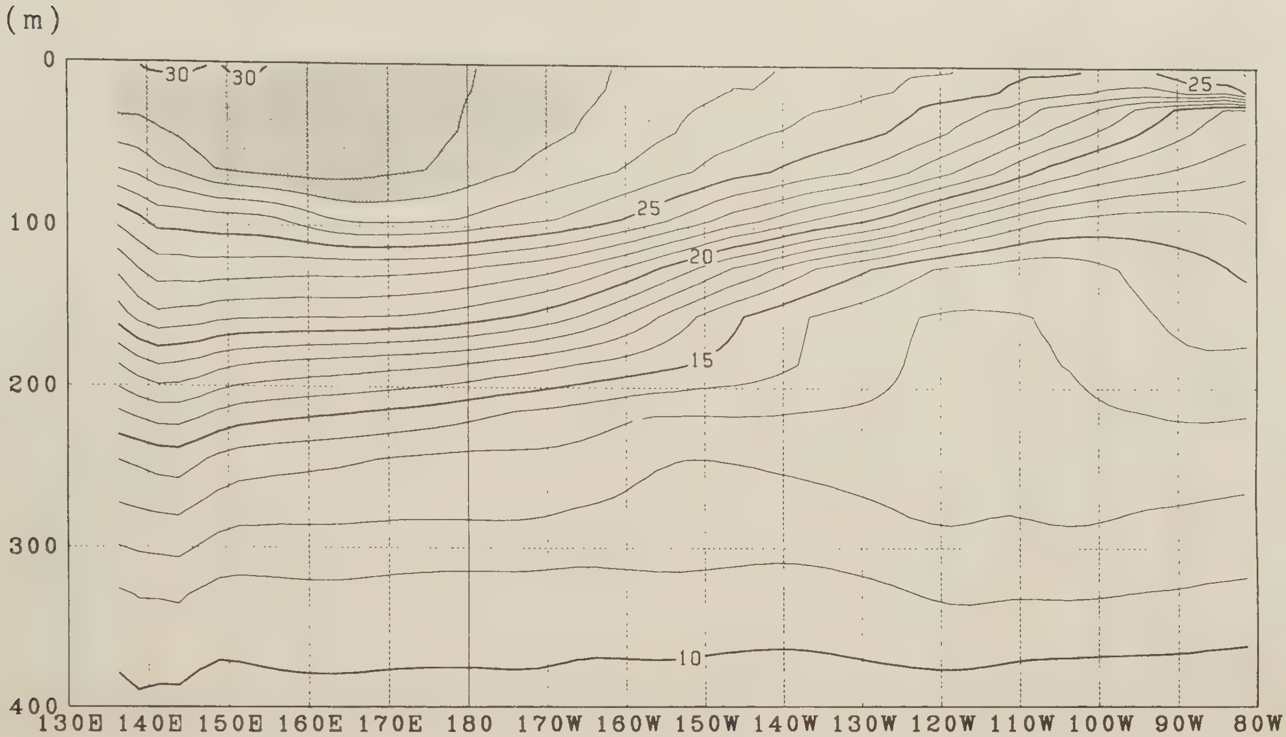
Fig. 20　Monthly mean subsurface (400 m) temperature in the Pacific Ocean for April 2003. Contour interval is 1 ˚C. (calculated by the Ocean Comprehensive Analysis System)

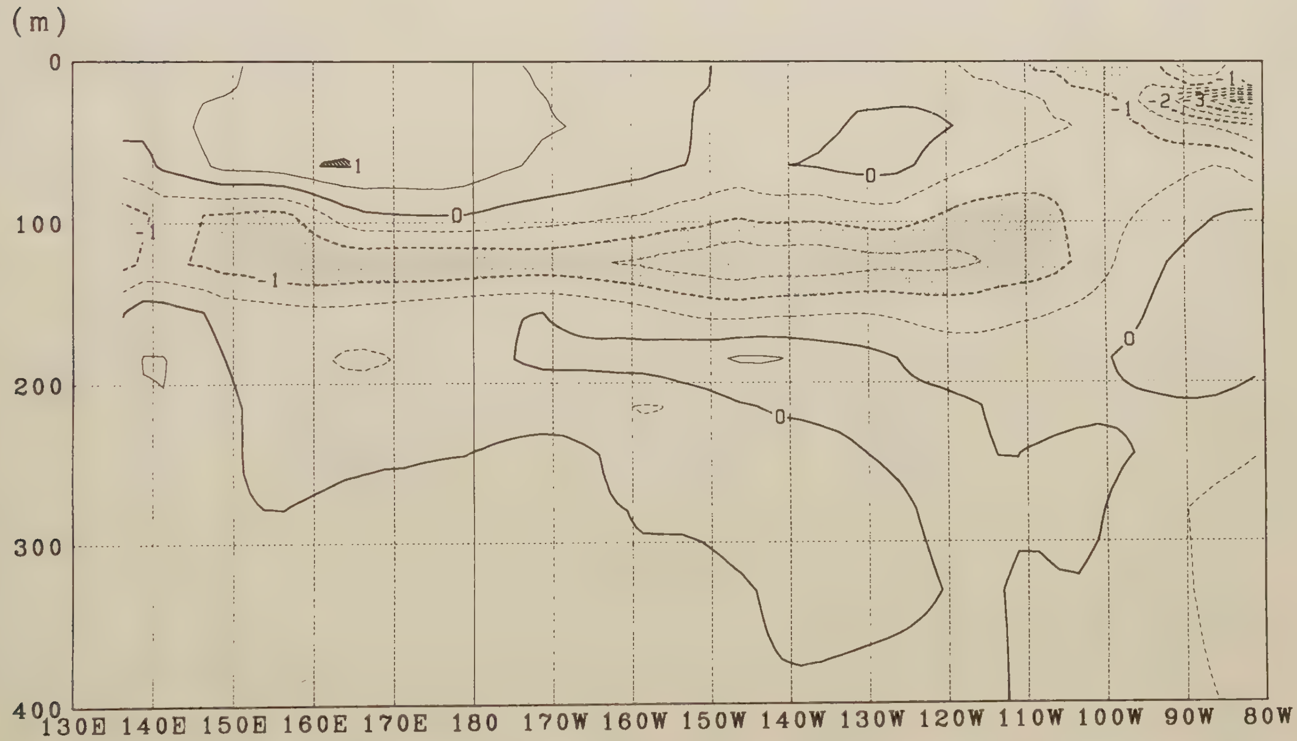


第 21 図　太平洋ブイ流跡図（2003 年 4 月）

Fig. 21　Trajectories of drifting buoys in the Pacific Ocean during April 2003. Each track is for one buoy. Small circles represent the last positions for the month.

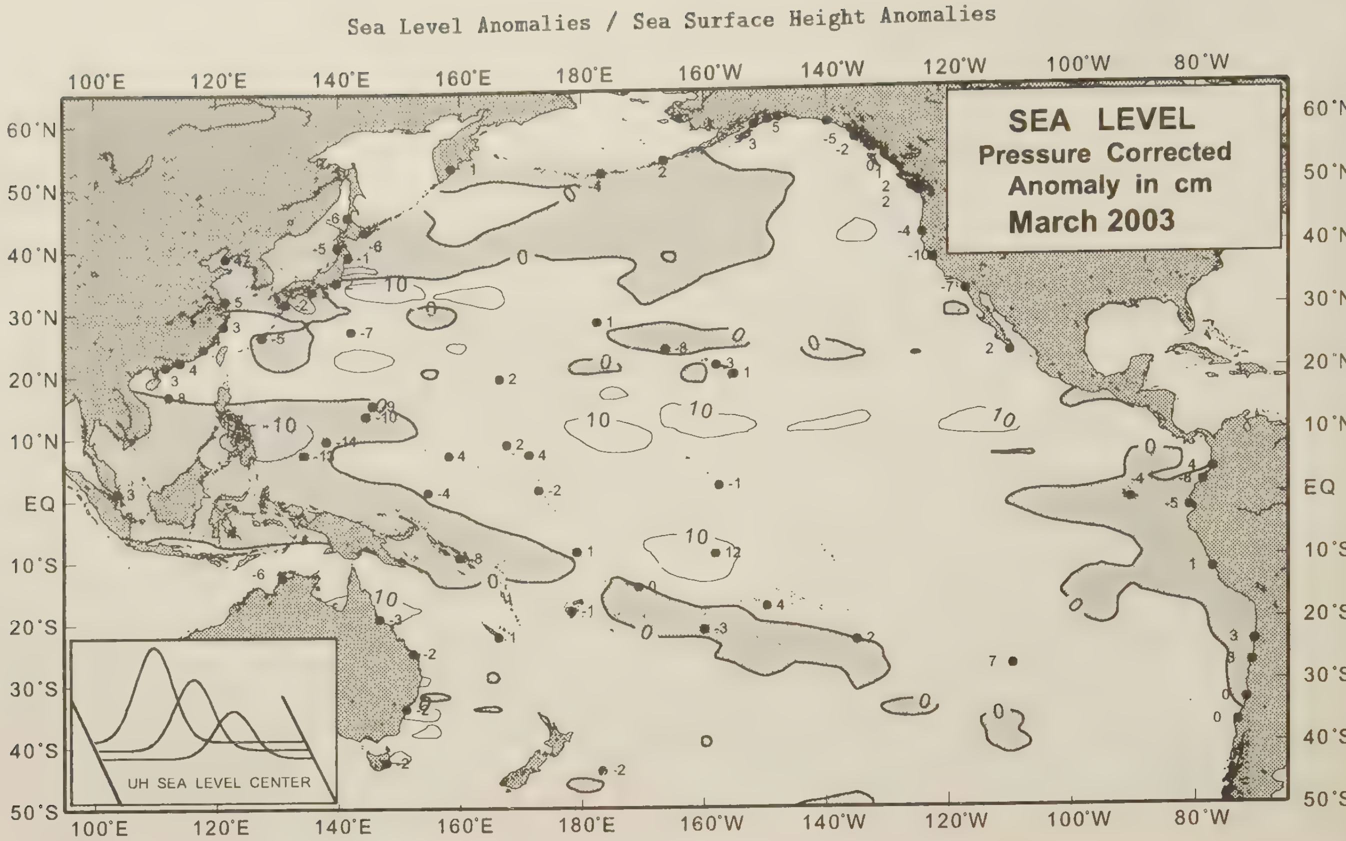
Depth-Longitude Sections of Equatorial Temperature & Anomalies





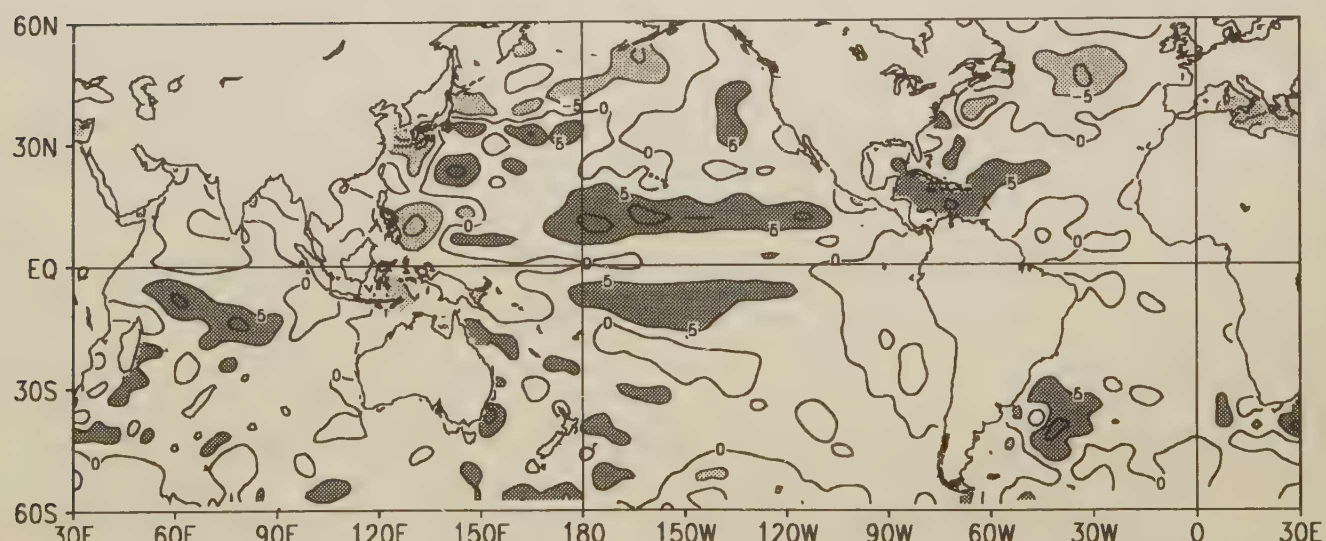
第22図　太平洋赤道に沿う表層水温（上）及び偏差（下）の深度－経度断面図（2003年 4月）

Fig. 22 Depth-longitude sections of temperature (top) and anomalies (bottom) along the equator in the Pacific Ocean for April 2003. Data are derived from the Ocean Data Assimilation System of JMA. Contour interval is 1°C (top) and 0.5°C (bottom). Values greater than 28°C in the top panel are shaded. In the bottom panel, values greater than 1°C are shaded and values less than -1°C are spotted. Anomalies are computed from 1987-2002 base period means.



第 23 図　太平洋月平均海面水位偏差図（2003 年 3 月）

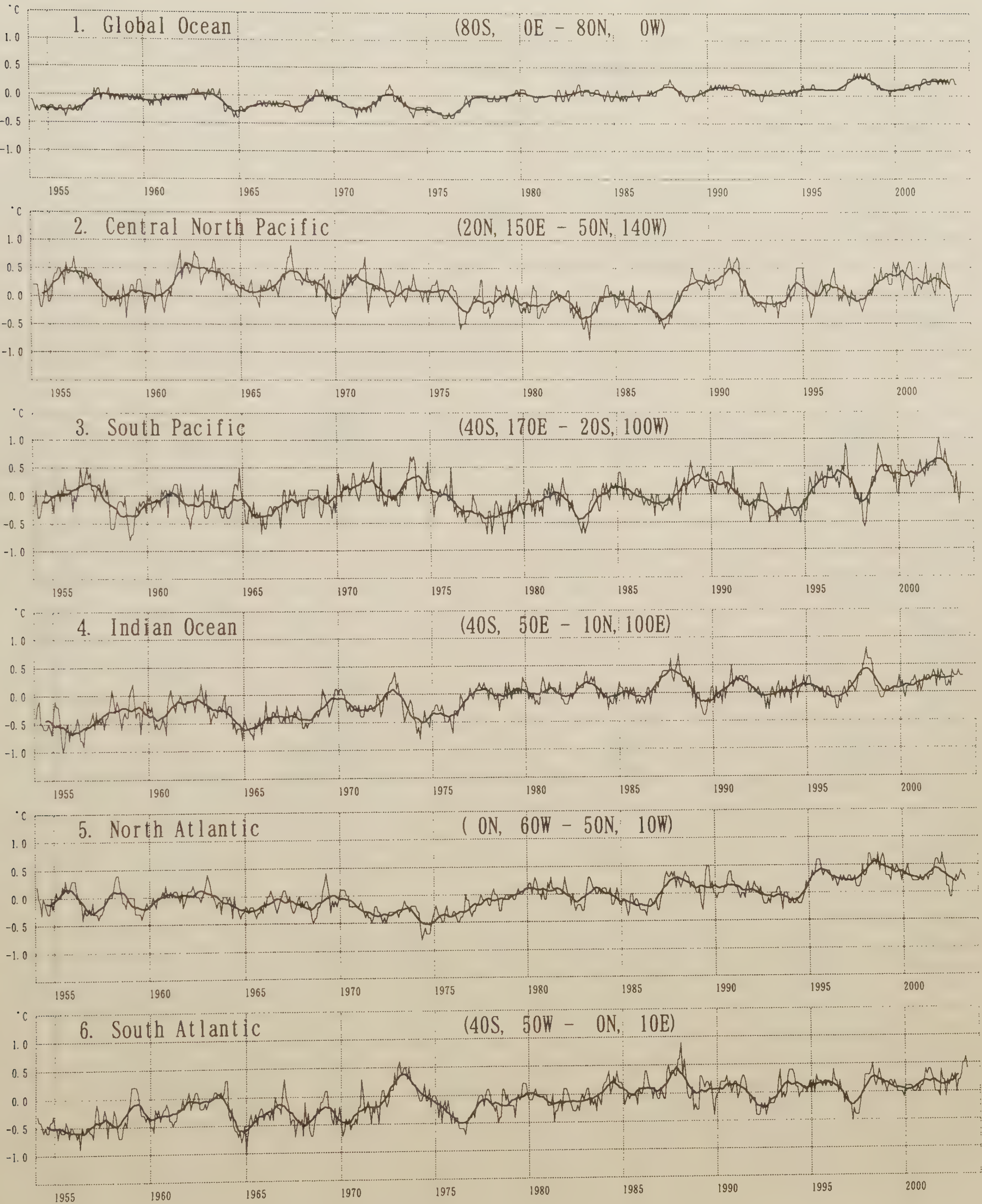
Fig. 23　Monthly sea level anomalies for March 2003 obtained from mean sea level (1993-2001) adjusted for atmospheric pressure. This figure is prepared by the SOC of ISLP-PAC, Department of Oceanography, University of Hawaii.



第 24 図　全球月平均海面高度偏差図（2003 年 3 月）

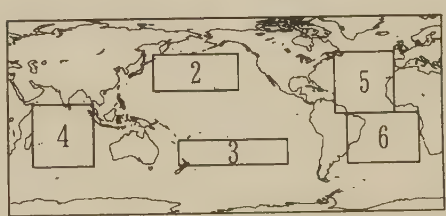
Fig. 24　Monthly sea surface height anomalies in the global ocean derived from the altimeter data of Jason-1 for March 2003. Contour interval is 5 cm. Positive anomalies exceeding +5 cm are shaded and negative anomalies exceeding -5 cm are spotted. Anomalies are computed from 1993-1998 base period means.

Long-term Variation of Monthly Mean SST Anomalies

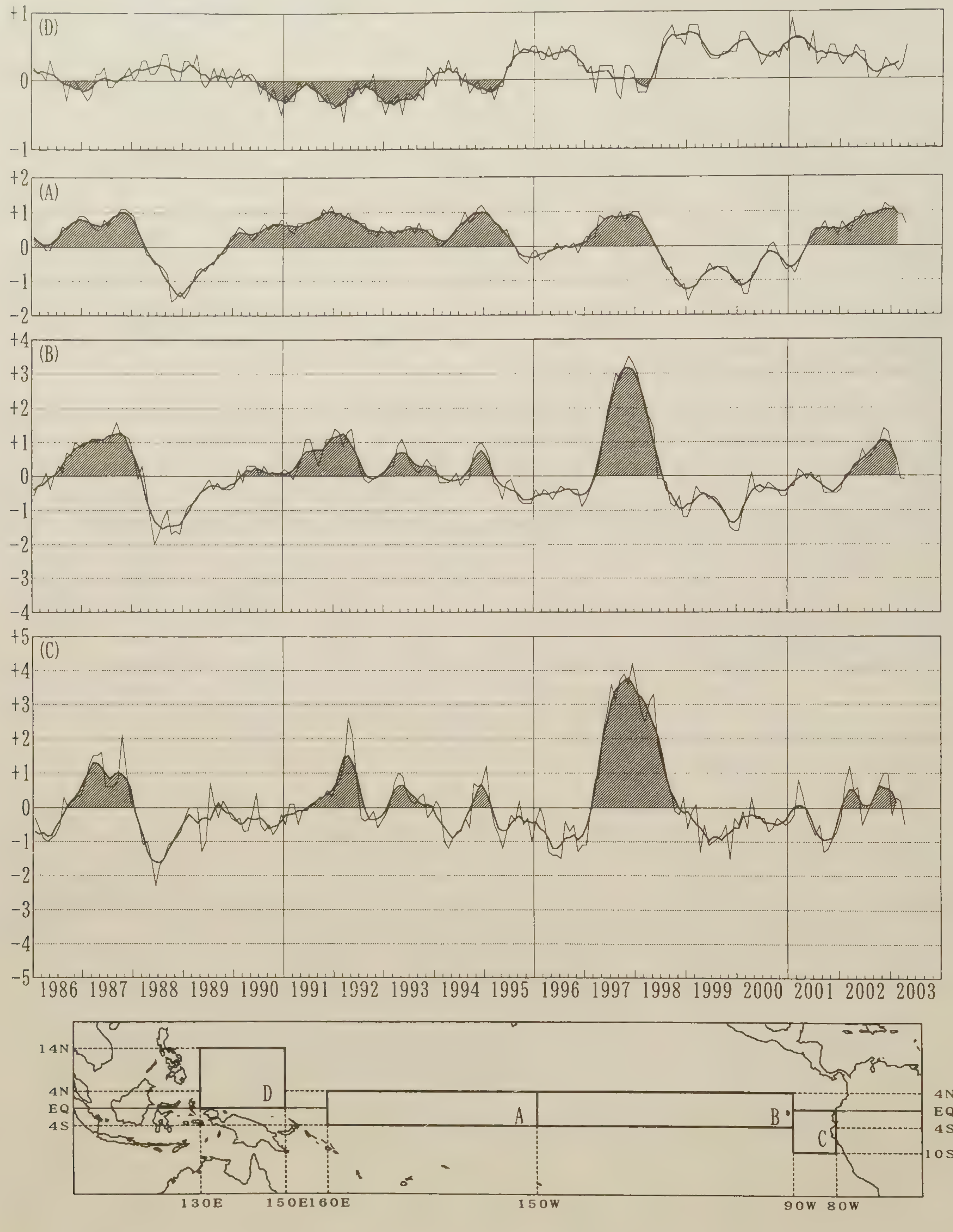


第25図 海域平均海面水温偏差の長期変動

Fig. 25 Long-term variations of monthly mean sea surface temperature anomalies (°C) for the areas shown in the right panel. Anomalies are computed from the JMA climatology (1971-2000). Thin lines show the monthly mean and thick lines their 13-month running means.



Time Series of Tropical Pacific SST Anomalies



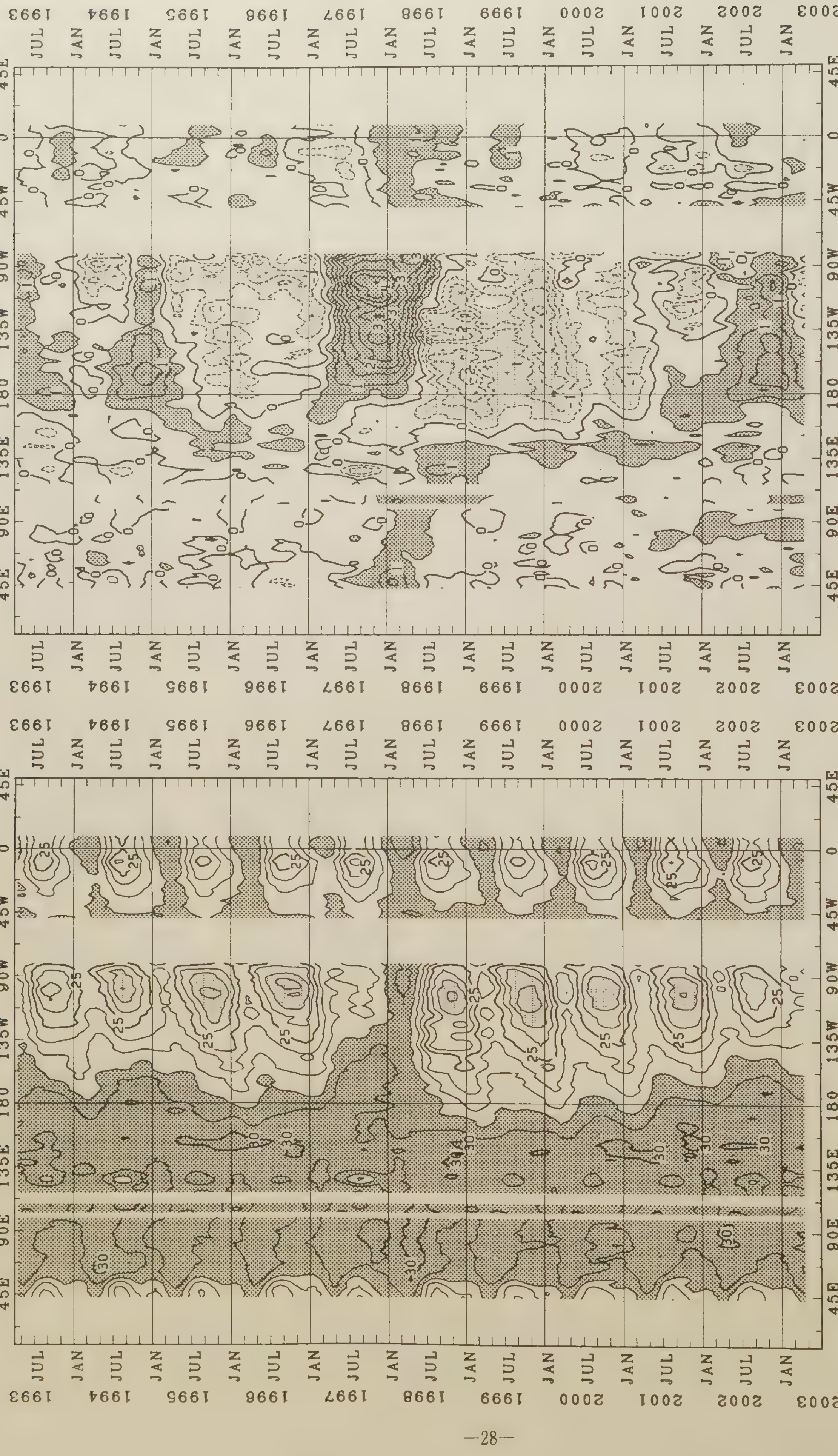
第26図　太平洋熱帯域の海面水温偏差時系列図

Fig. 26 Time series of monthly mean SST anomalies (°C) in the tropical Pacific Ocean for the areas indicated at the bottom panel. Thin lines show the monthly means and thick lines their 5-month running means. Positive anomalies (A, B, C) and negative anomalies (D) are shaded. Anomalies are computed from the JMA climatology (1971-2000).

MONTH YEAR	SEA SURFACE TEMPERATURE AND ANOMALY (°C) REGION D 14N-EQ 130E-150E		REGION A 4N-4S 160E-150W		REGION B 4N-4S 150W-90W		REGION C EQ-10S 90W-80W		SOI	SEA LEVEL PRESSURE ANOMALY (hPa) TAHITI 17-33S 149-37W	DARWIN 12-24S 130-52E
JAN 01	29.4	0.9	27.4	-0.6	25.1	-0.3	24.1	-0.4	0.8	2.5	0.6
FEB 01	28.9	0.6	27.2	-0.8	26.0	-0.3	25.8	-0.2	1.0	-0.4	-3.2
MAR 01	29.1	0.6	27.6	-0.5	27.3	0.2	27.1	0.8	0.8	1.3	-0.2
APR 01	29.4	0.6	28.0	-0.2	27.3	0.1	25.8	0.4	0.1	-0.1	-0.3
MAY 01	29.7	0.4	28.7	0.1	26.8	-0.1	24.1	-0.2	-0.7	-0.2	0.9
JUN 01	30.1	0.7	28.9	0.4	26.3	0.1	22.4	-0.5	0.2	-0.2	-0.5
JUL 01	29.5	0.2	29.0	0.5	25.3	-0.1	21.1	-0.8	-0.2	-0.1	0.3
AUG 01	29.5	0.3	28.9	0.5	24.7	0.0	20.4	-0.5	-0.7	-0.9	0.1
SEP 01	29.6	0.3	29.1	0.7	24.2	-0.5	19.2	-1.3	0.1	-0.2	-0.4
OCT 01	29.9	0.5	28.8	0.4	24.2	-0.5	19.7	-1.2	-0.1	-0.9	-0.9
NOV 01	29.8	0.5	28.9	0.5	24.2	-0.5	20.9	-0.9	0.6	0.7	-0.4
DEC 01	29.3	0.3	28.5	0.3	24.5	-0.5	22.2	-0.7	-0.8	-1.2	0.3
JAN 02	28.7	0.2	28.7	0.7	25.0	-0.4	24.2	-0.3	0.3	1.3	0.7
FEB 02	28.6	0.3	28.5	0.5	26.3	0.0	26.7	0.7	0.7	1.5	-0.2
MAR 02	28.8	0.3	28.5	0.4	27.2	0.1	27.5	1.2	-0.2	0.4	1.0
APR 02	29.3	0.5	29.0	0.8	27.5	0.3	25.9	0.5	-0.1	0.1	0.3
MAY 02	29.7	0.4	29.4	0.8	27.2	0.3	24.9	0.6	-1.3	-1.1	0.7
JUN 02	29.8	0.4	29.5	1.0	27.0	0.8	22.4	-0.5	-0.4	-0.2	0.4
JUL 02	29.3	0.0	29.3	0.8	25.9	0.5	21.7	-0.2	-0.7	0.5	1.6
AUG 02	29.2	0.0	29.3	0.9	25.3	0.6	21.0	0.1	-1.2	-1.4	0.5
SEP 02	29.3	0.0	29.3	0.9	25.5	0.8	20.9	0.4	-0.5	-0.3	0.8
OCT 02	29.5	0.1	29.3	0.9	25.7	1.0	21.6	0.7	-0.5	-1.0	-0.3
NOV 02	29.6	0.3	29.6	1.2	26.1	1.4	22.8	1.0	-0.4	0.1	1.0
DEC 02	29.2	0.2	29.3	1.1	26.3	1.3	23.9	1.0	-1.0	-0.1	1.7
JAN 03	28.7	0.2	29.1	1.1	26.2	0.8	24.3	-0.2	-0.1	-0.1	0.2
FEB 03	28.4	0.1	28.9	0.9	26.8	0.5	26.3	0.3	-0.5	-1.5	-0.2
MAR 03	28.7	0.2	29.0	0.9	27.0	-0.1	26.5	0.2	-0.3	-0.2	0.5
APR 03	29.3	0.5	28.8	0.6	27.1	-0.1	24.9	-0.5	-0.1	0.5	0.8

第1表　太平洋熱帯域の大気及び海洋の監視指数

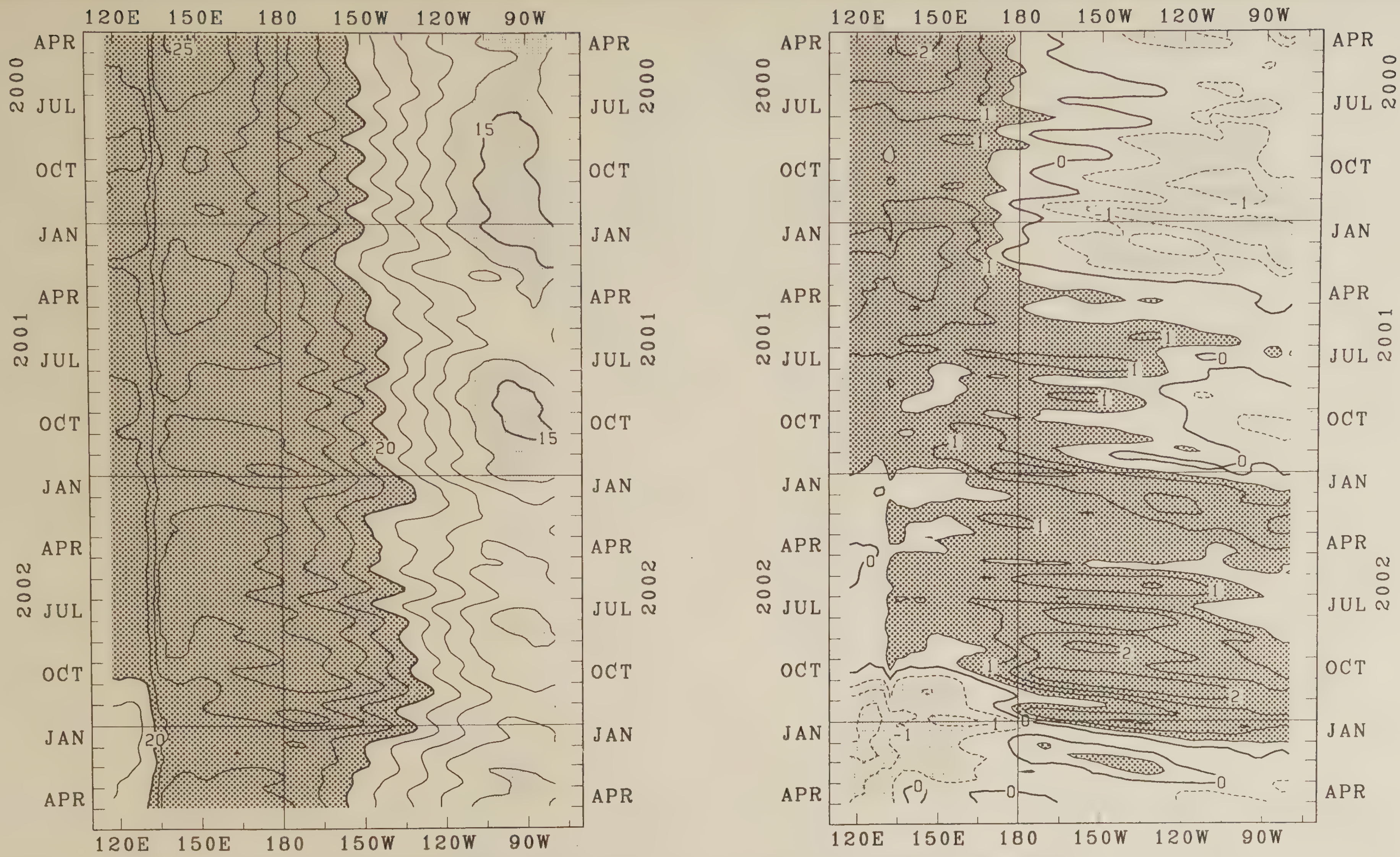
Table 1　Atmospheric and oceanic monitoring indices in the tropical Pacific Ocean



第27図　赤道に沿った海面水温（左）および偏差（右）の時間-経度断面図

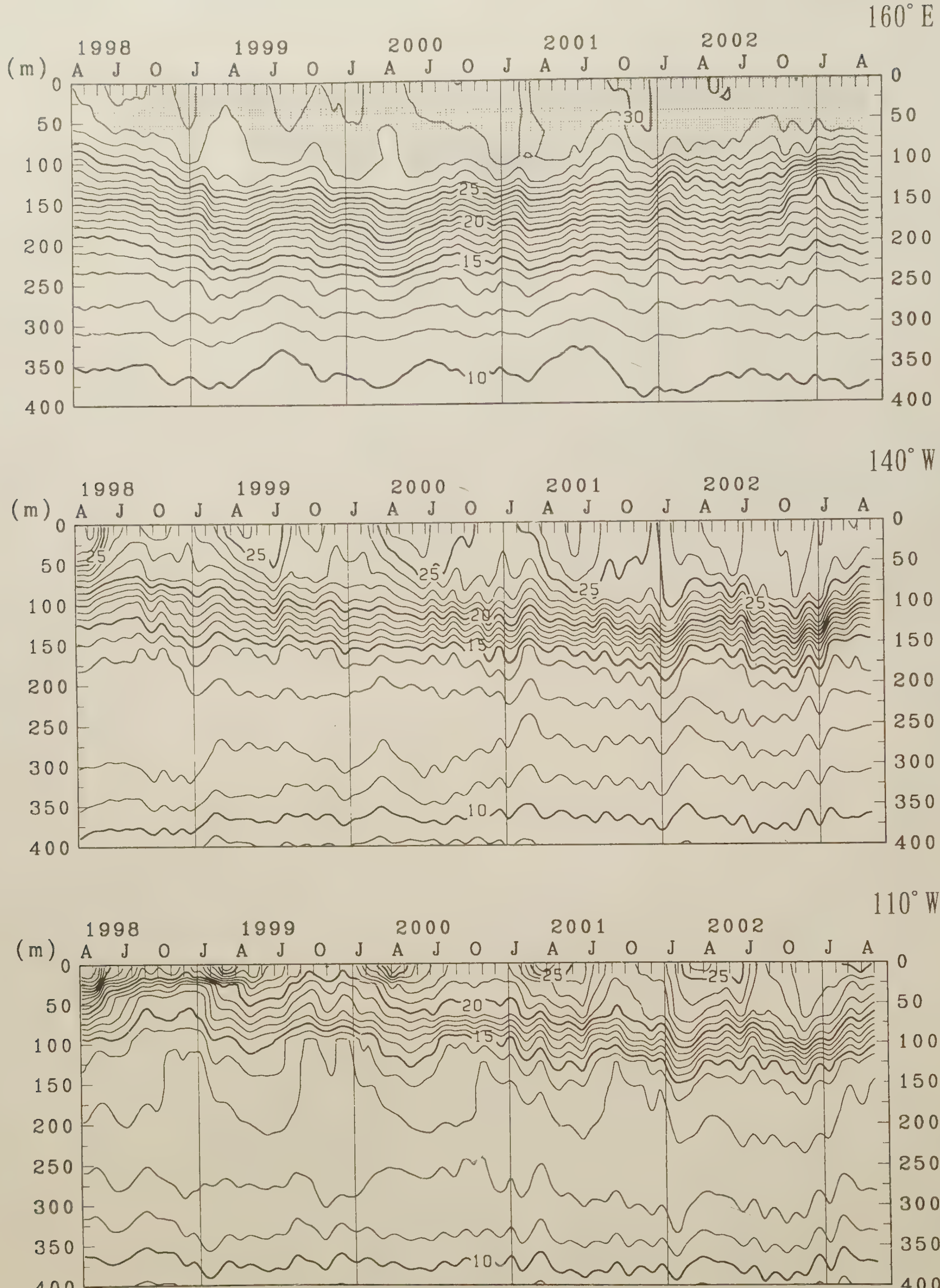
Fig. 27　Time-longitude sections of SSTs (left) and anomalies (right) along the equator (2 °N-2 °S) in the global ocean. Contour interval is 1 °C (left) and 0.5 °C (right). Values greater than 28 °C (+0.5 °C) are shaded and values less than 23 °C (-0.5 °C) are spotted in the left (right) panel. Dashed contours indicate negative anomalies in the right panel. Anomalies are computed from 1971-2000 base period means.

Time-Longitude Sections of Ocean Heat Content & Anomalies (Eq.)



第28図　太平洋の赤道に沿う海洋表層の貯熱量（左）及び偏差（右）の時間－経度断面図

Fig. 28 Time-longitude sections of ocean heat content in the upper 260 m along the equator (left) and anomalies (right) in the Pacific Ocean. Data are derived from the Ocean Data Assimilation System of JMA. Contour interval is 1°C (left) and 0.5°C (right). Values greater than 20°C (+0.5°C) are shaded and values less than 16°C (-0.5°C) are spotted in the left (right) panel. Dashed contours indicate negative anomalies in the right panel. Anomalies are computed from 1987-2002 base period means.



第29図　太平洋赤道域の表層水温の時間－深度断面図

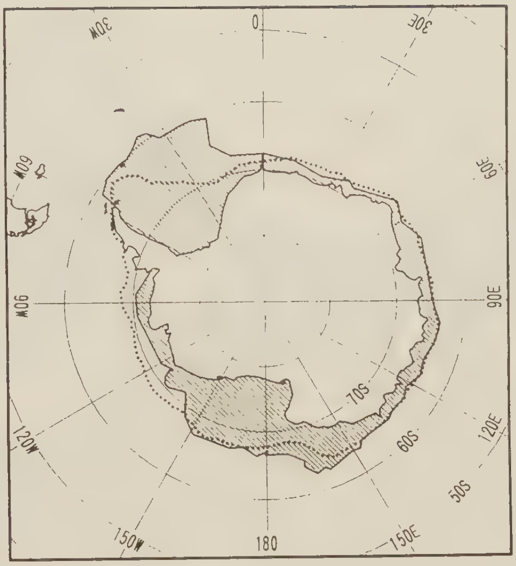
（上：西部、中：中部、下：東部）

Fig. 29 Time-depth sections of equatorial subsurface temperature for the western Pacific (top, 160°E), the central Pacific (middle, 140°W) and the eastern Pacific (bottom, 110°W). Data are derived from the Ocean Data Assimilation System of JMA. Contour interval is 1°C. Values greater than 28°C are shaded.



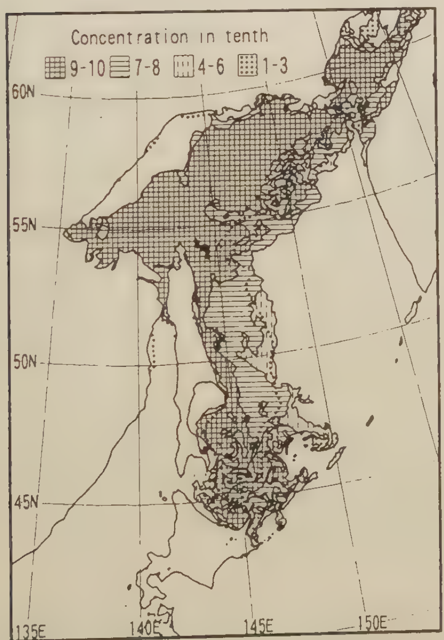
第30-1図　北極域の海氷図（2003年 4月18日）

Fig.30-1 Sea ice chart in the Arctic on 18 Apr. 2003.
The shaded area represents the sea ice extent. The dotted line denotes the mean ice edge averaged for the period from 1972 through 1990.
The data source is the National Ice Center (USA).



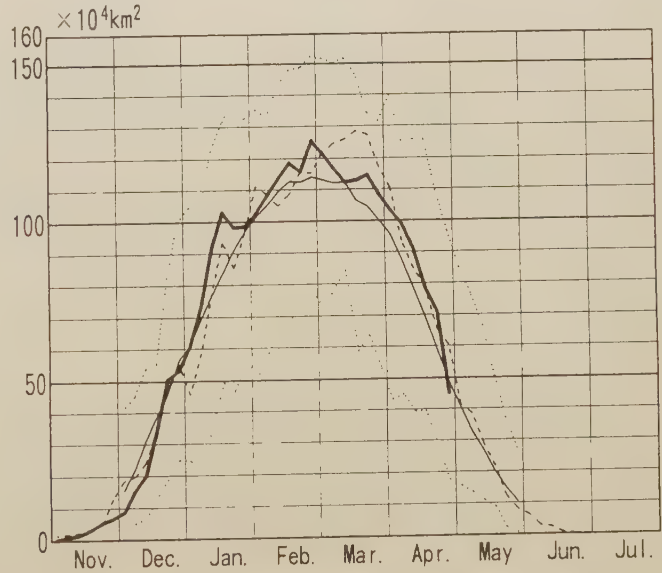
第30-2図　南極域の海氷図（2003年 4月16日）

Fig.30-2 Sea ice chart in the Antarctic on 16 Apr. 2003.
The shaded area represents the sea ice extent. The dotted line denotes the mean ice edge averaged for the period from 1973 through 1990.
The data source is the National Ice Center (USA).



第30-3図 オホーツク海の海氷図（2003年 4月15日）

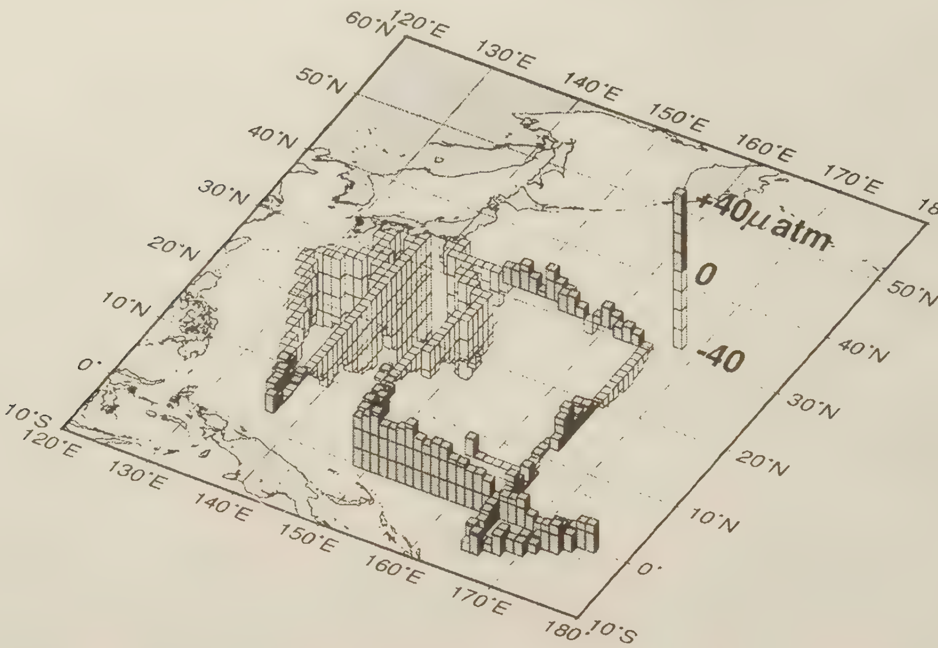
Fig.30-3 Sea ice chart in the Sea of Okhotsk on 15 Apr. 2003.
The dotted line denotes the mean ice edge averaged for the period from 1971 through 2000.



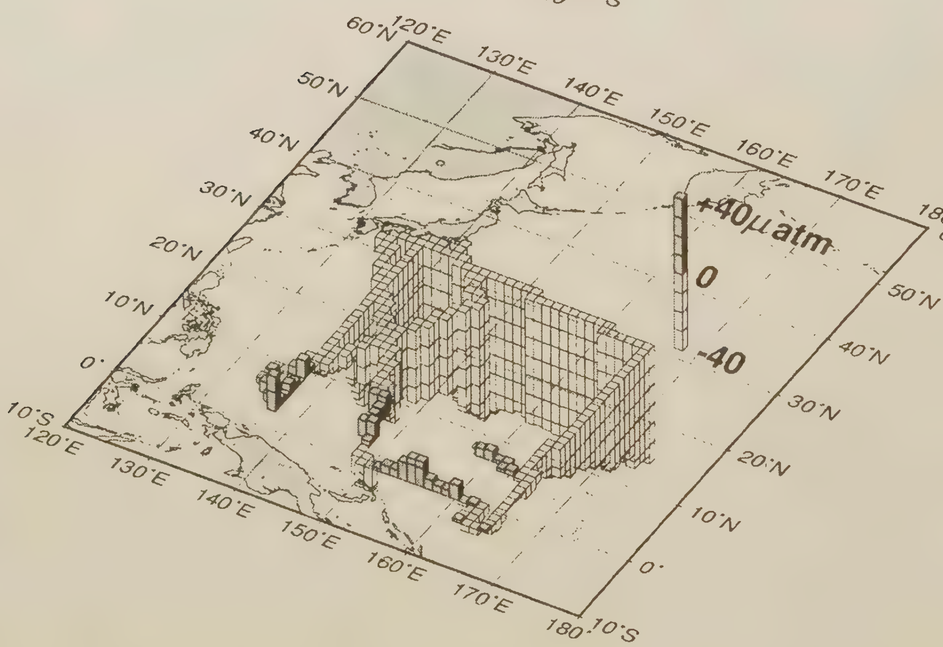
第30-4図 オホーツク海の海氷域面積

Fig.30-4 Time-series of 5-day sea ice area in the Sea of Okhotsk.
: current season (2002/2003)
: mean extent (1971-2000)
: maximum or minimum extent (1971-2002)
: last season (2001/2002)

(a)

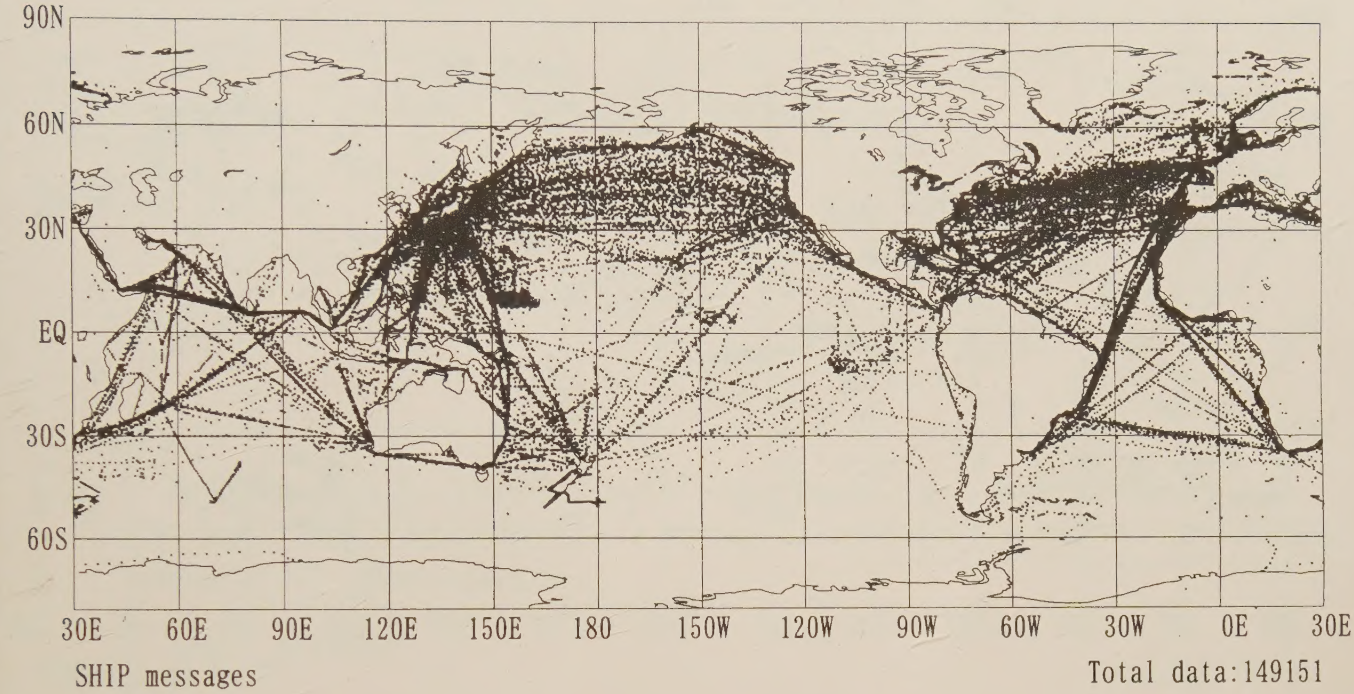


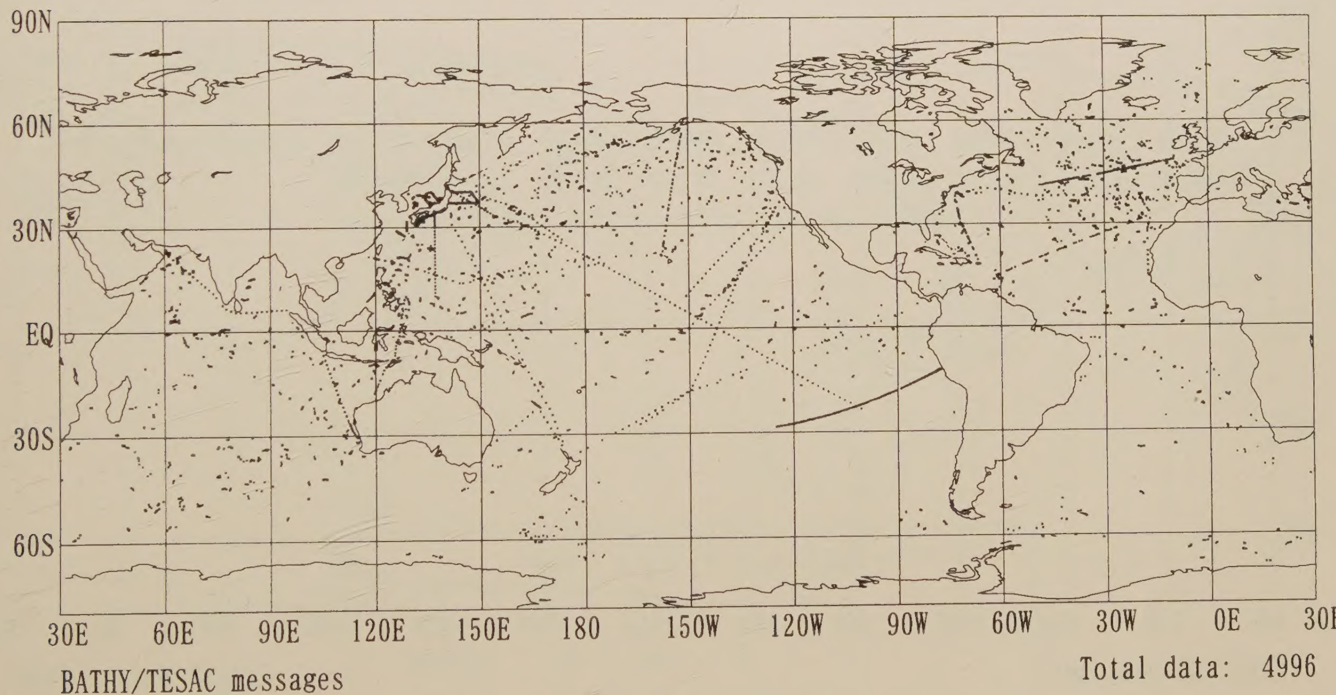
(b)



第31図　気象庁「凌風丸」及び神戸海洋気象台「啓風丸」が、(a)2002年10月1日から12月4日にかけてと、(b)2003年1月15日から3月7日にかけて北西太平洋で観測した洋上大気中と表面海水中とのCO_2の濃度差。棒グラフは、海洋から大気へCO_2を放出する場合を濃い陰影、海洋が大気のCO_2を吸収する場合を薄い陰影に示してある。

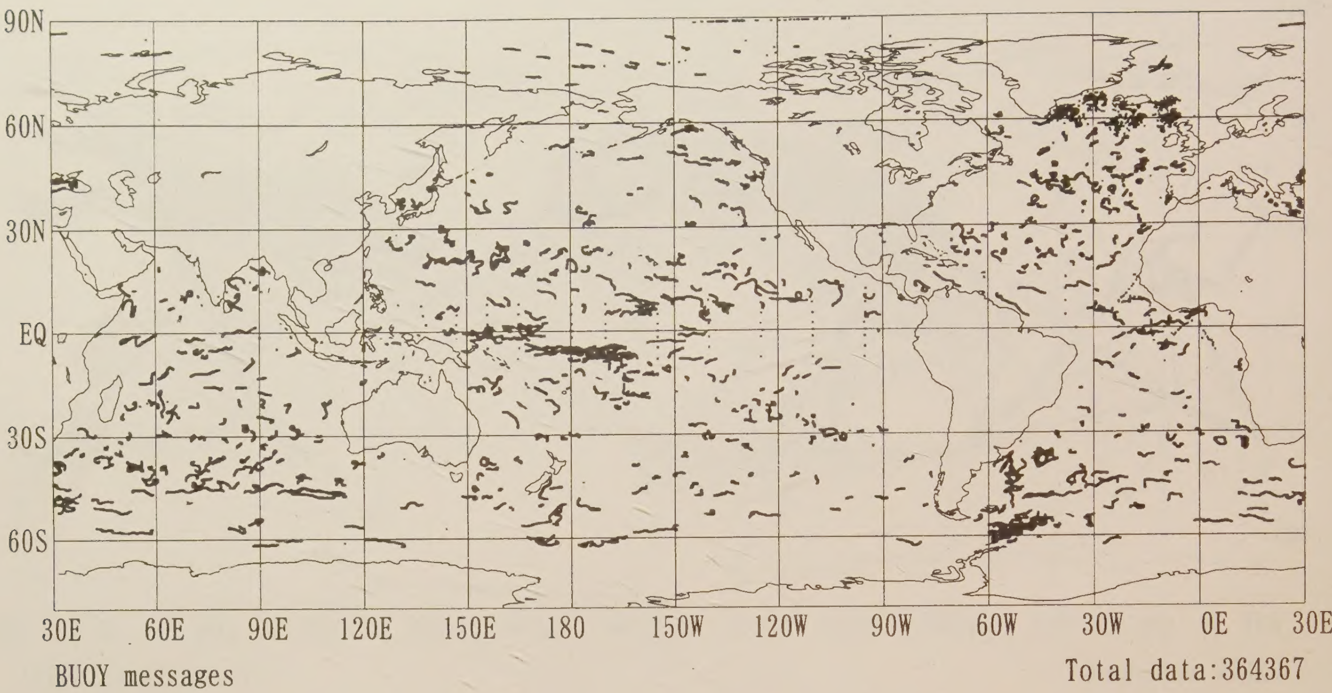
Fig. 31　Difference in the CO_2 concentration between the surface water and the overlying atmosphere in the western North Pacific observed by the R/V Ryofu Maru of the JMA and the R/V Keifu Maru of the Kobe Marine Observatory, (a) from October 1 to December 4, 2002 and (b) from January 15 to March 7, 2003. Darker-shaded upward pillars indicate that the oceanic CO_2 was emitted into the atmosphere, and lighter-shaded downward pillars indicate that the atmospheric CO_2 was absorbed into the ocean, respectively.

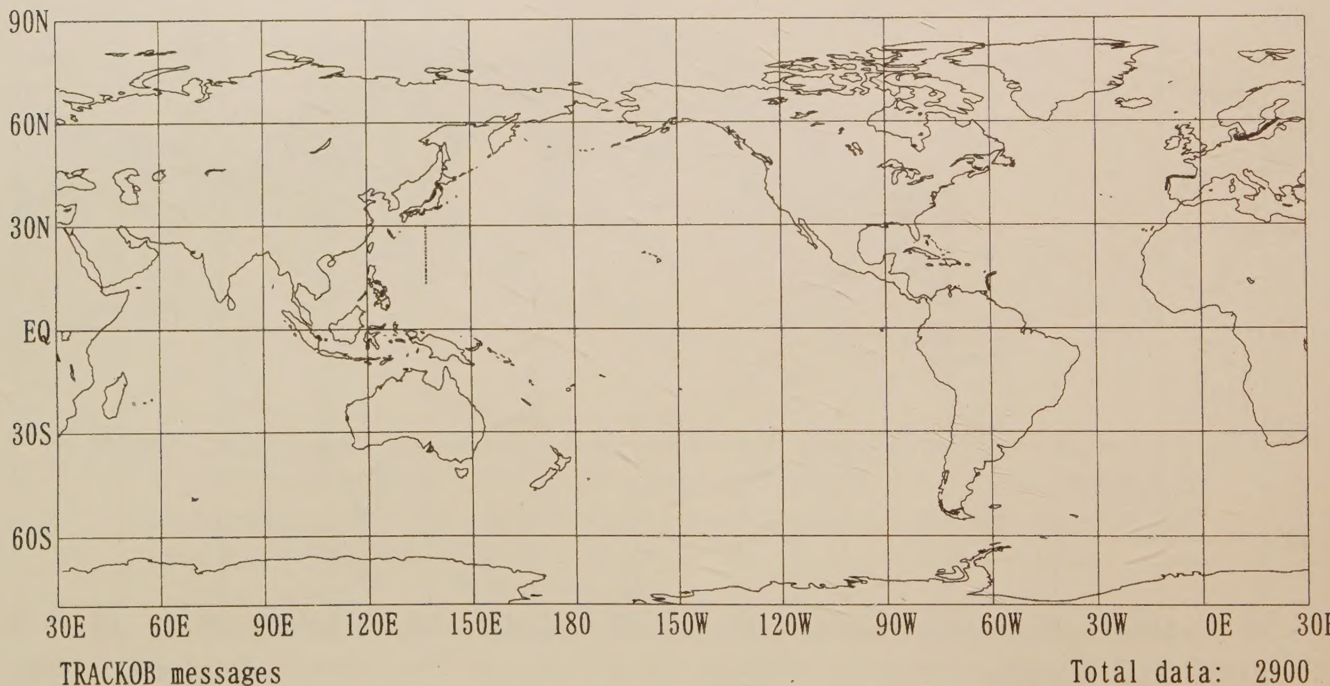




第32-1図　測点分布図(2003年 4月)

Fig. 32-1 Geographical distribution of SHIP messages (SST data, top) and BATHY/TESAC messages (subsurface temperature data, bottom) for April 2003.





第32-2図　測点分布図(2003年 4月)

Fig. 32-2 Geographical distribution of BUOY messages (buoy drift and SST data, top) and TRACKOB messages (ship drift and SST data, bottom) for April 2003.

気 象 庁 海 洋 月 報

Monthly Ocean Report

April 2003 (No. 124)

本月報掲載の 2003 年 4 月のプロダクトには、気象庁が観測したデータ及び GTS（全球気象通信網）を通じて入手した国際気象通報式による通報のほか、下記の機関等から提供いただいたデータを使用しています。御礼申し上げます。

防衛庁、海上保安庁

水産総合研究センター

（社）漁業情報サービスセンター

北海道大学

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（順不同）

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